This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

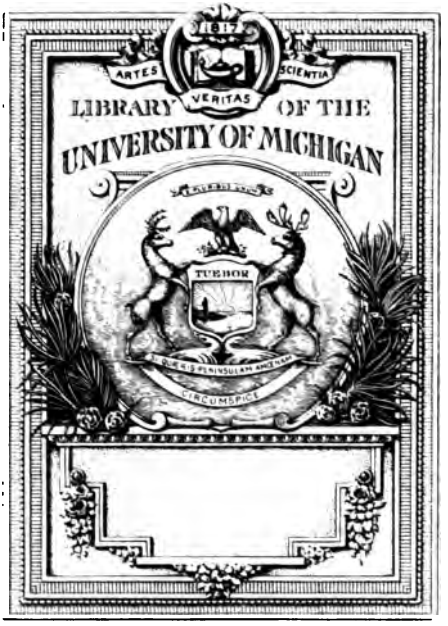
+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

A 437032


ARTES
VERITAS
SCIENTIA
LIBRARY OF THE
UNIVERSITY OF MICHIGAN
TUEBOR
CIRCUMSPICE

LA
348
.C6
A3

MEASURING THE WORK OF THE PUBLIC SCHOOLS

THE SURVEY COMMITTEE OF THE CLEVELAND FOUNDATION

Charles E. Adams, Chairman
Thomas G. Fitzsimons
Myrta L. Jones
Bascom Little
Victor W. Sincere

Arthur D. Baldwin, Secretary
James R. Garfield, Counsel
Allen T. Burns, Director

THE EDUCATION SURVEY

Leonard P. Ayres, Director

CLEVELAND EDUCATION SURVEY

MEASURING THE WORK OF THE PUBLIC SCHOOLS

BY

CHARLES HUBBARD JUDD
DIRECTOR OF THE SCHOOL OF EDUCATION
OF THE UNIVERSITY OF CHICAGO

THE SURVEY COMMITTEE OF THE
CLEVELAND FOUNDATION
CLEVELAND · OHIO

10 1916

COPYRIGHT, 1916, BY

THE SURVEY COMMITTEE OF THE
CLEVELAND FOUNDATION

Printed February, 1916, 1300 copies
Reprinted April, 1916, 1500 copies

WM. F. FELL CO. PRINTERS
PHILADELPHIA

FOREWORD

This report on "Measuring the Work of the Public Schools" is one of the 25 sections of the report of the Education Survey of Cleveland conducted by the Survey Committee of the Cleveland Foundation in 1915. Twenty-three of these sections will be published as separate monographs. In addition there will be a larger volume giving a summary of the findings and recommendations relating to the regular work of the public schools, and a second similar volume giving the summary of those sections relating to industrial education. Copies of all these publications may be obtained from the Cleveland Foundation. They may also be obtained from the Division of Education of the Russell Sage Foundation, New York City. A complete list will be found in the back of this volume, together with prices.

TABLE OF CONTENTS

	PAGE
Foreword	5
List of Tables	12
List of Diagrams	13
Prefatory Statement	15
CHAPTER	
I. Problems Exhibited by Non-promotions	17
Aggregate Failures in All Grades	19
Mental Incapacity as an Explanation	23
Failures in Subjects	23
Failures in Reading	24
Failures in Arithmetic	26
Records in Other Subjects	28
Records of Individual Schools	29
Records for a Period of Years in Particular Schools	33
Individual Schools Compared with the Whole System	36
Variations in Grades	36
The Need for Scientific Supervision	41
Discussion of Remedies	42
Negative Recommendation	42
Indirect Methods of Educating Teachers	42
Changes in the Course of Study	43
Summary	43
II. Observations in the Schools	45
Methods of Recording Visits	45
Foreign Children	46
Emphasis on Traditional Subjects	48
Behavior in Classes Excellent	49
Fluctuations in Quality of Teaching and Supervision	49
Observations on Supervision	50
Dearth of Men in Elementary Schools	51
Little Departmental Teaching	52
Necessity for Interchange of Professional Experience	52
Central Supervision	53
Summary	55

293889

CHAPTER		PAGE
III.	TESTS AND STATISTICAL STUDIES	56
	Tests Show Wide Variations in Grades	57
	Tests Reveal Lack of Definite Aims at Many Points	58
	Tests as a Basis of Administration	58
	The Meaning of Criticism	59
	Convergence of Various Lines of Evidence	60
	Summary	60
IV.	TESTS OF HANDWRITING	61
	Uniform Conditions	61
	Complications Encountered in Writing Tests	61
	Scope of the Cleveland Test	63
	Speed in Various Grades	63
	Standards Actually Accepted in Schools	66
	Individual Rates	66
	Method of Rating Quality	66
	Variations in Quality	68
	Individual Records of Quality	70
	Relation of Speed and Quality	70
	Standards Derived from Experience	71
	Emphasis in Various Schools	75
	Comparison of Cleveland with Other Cities	77
	Recommendations	80
	Summary	80
V.	TESTS OF SPELLING	82
	Words for the Tests	82
	Number of Returns	83
	Variation in Schools and Grades	83
	Variations in Rates of Progress in Different Schools	89
	Cleveland Has an Average Record	89
	Recommendations	92
	Summary	92
VI.	STUDIES OF ARITHMETIC	94
	Spiral Character of the Test	95
	Test of Speed	96
	The 15 Tests	101–109
	Complexity of Educational Process	110
	Variations in Different Schools	111
	Practical Application of Results	118
	Diagnosis of Individual Cases	122
	Recommendations	122
	Summary	123

CHAPTER		PAGE
VII.	STUDIES OF READING	124
	Difficulties Encountered in Testing Reading	126
	Study of Rate of Reading Made by All Elementary Teachers	127
	Complications Encountered in the Study	129
	Contrast Between Oral and Silent Reading	130
	Silent Reading Should Be Cultivated	134
	Description of Exact Tests	134
	Tests of Oral Reading	135
	Variations in Schools	139
	Analysis to Show Influence of Sex, Books, and Nationality	139
	Individual Achievement	147
	Achievement in Cleveland as Compared with Other Cities	148
	Tests in Silent Reading	150
	Comparison of Cleveland Pupils with Others	151
	General Relation Between Rate and Quality of Silent Reading	153
	Explanation of the Cleveland Record	156
	Records of Various Schools	158
	Recommendations	159
	Summary	160
VIII.	KINDERGARTENS AND PRIMARY GRADES	162
	Method of Securing Facts	162
	Influence of the Kindergarten Training School	164
	Kindergartens Well Equipped	165
	Results of Kindergarten Training Not Clear	166
	Method of Promotion into First Grade Criticized	167
	Relation of Kindergarten Training to Work in First Grade	167
	Suggestions as to Closer Articulation	168
	The Situation in Need of Change	169
	Quotations	169
	Recommendations	172
	Summary	173
IX.	RELATION BETWEEN ELEMENTARY SCHOOLS AND HIGH SCHOOLS	174
	Comparison of Records of Standings	176
	The Type of Elementary Students Who Enter High School	177

CHAPTER PAGE

Differences between Individual Schools 178
Method of Comparing Records 181
Recommendations 185
Summary 186

X. High Schools 187
Study of High Schools 189
Ranks of Entering Students 190
Ages of Students in Various Schools 193
Withdrawals and Non-promotions 194
High School Grades in the First Year 196
Number of Repeaters, Students Dropped, and Failures 200
Comparisons of Four Schools 201
Comparisons of Academic, Technical, and Commercial Schools 206
Comparisons between Successive Years 210
Failures in Non-required Subjects 217
Registration in the Different Schools 222
Junior High Schools 224
Cosmopolitan High Schools 228
Recommendations 232
Summary 233

Appendix 235
Handwriting 235
Letter from Superintendent 235
Scoring the Samples 236
Spelling 237
Letters from Superintendent 237
Words Used in Spelling Tests 238
Spelling Tests in Sentences 242
Use of Spelling Scores 243
Arithmetic 245
Letter from Superintendent 245
Arithmetic Tests 246
Scoring Arithmetic Results 254
Reading 255
Letter from Superintendent 255
Tests of Reading 255
Calculation of Mean Deviations 262
Standardized Paragraphs for Oral Reading 263
Directions for Giving Oral Reading Tests 267

APPENDIX PAGE

Directions for Giving Silent Reading Tests 268
Co-operation of Normal School Seniors 269
Scoring Results in Oral Reading 269
Tests of Silent Reading 275

KINDERGARTENS 282

Letter from Superintendent 282

RANKS OF PUPILS IN ELEMENTARY AND HIGH SCHOOLS 283

Letter to High School Principals 284
Letter to Elementary School Principals 285
Use of Data on Elementary and High School Ranks 286
Correcting Results of Study of Ranks 287

DIAGRAM PAG

34. Median scores in oral reading for 43 fourth grades 14
35. Oral reading for girls and boys in eight grades 14
36. Oral reading, the Ward system versus Aldine system 14
37. Oral reading in American, Italian, and Hebrew schools 14
38. Oral reading in American, Polish, and Bohemian schools 14
39. Oral reading in Cleveland schools and Illinois schools 14
40. Rate of silent reading in Cleveland and other cities 15
41. Quality of silent reading in Cleveland and other cities 15
42. Cleveland pupils in nine groups in silent reading 15
43. Speed and quality of silent reading in Cleveland and other cities 15
44. Ranks of eighth grade pupils entering high school 17
45. Ranks of eighth grade pupils entering high school from six schools 17
46. High school pupils from each third of eighth grade classes 19
47. Retardation among boys and girls in each kind of high school 19
48. Boys and girls withdrawing and not promoted in high schools 19
49. Variations in marking systems in Cleveland high schools 19
50. Identity of "second term" and "first term" students 20
51. Repeaters, pupils dropped, and pupils failed, in English in four high schools 20
52. Repeaters, pupils dropped, and pupils failed, in mathematics in four high schools 20
53. Repeaters in English and mathematics in high schools 20
54. Pupils dropped in English and mathematics in high schools 20
55. Pupils failed in English and mathematics in high schools 20
56. First year pupils failed in English in nine high schools 21
57. Second year pupils failed in English in nine high schools 21
58. Third year pupils failed in English in nine high schools 21
59. First year pupils failed in mathematics in nine high schools 21
60. Second year pupils failed in mathematics in nine high schools 21

PREFATORY STATEMENT

The studies included in this report are, in an important sense of the term, the central studies of the education survey. It will be difficult to assign credit in detail for each part of the work.

Acknowledgment should be made first of the co-operation given by the superintendent, the officers at school headquarters, the principals, and the teachers. All were most willing in collecting material and preparing reports. Acknowledgment is also made of the co-operation of the senior class of the City Normal School in giving the reading tests.

A very large part of the visiting and much of the work on the results of the tests were carried on by three permanent members of the Survey Staff, Messrs. George S. Counts, Joseph F. Gonnelly, and William S. Gray. Mr. Counts was especially connected with the spelling tests and the preparation of the arithmetic test. Mr. Gonnelly compiled the material showing the relations between elementary schools and high schools. Mr. Gray prepared the material on reading.

Mr. Stuart A. Courtis of Detroit accepted an invitation of the Survey Staff to come to a conference at which the arithmetic tests were planned. He gener-

ously co-operated also by furnishing from his results and his large experience the material necessary to make up the tests.

Professor J. F. Bobbitt took charge of the arithmetic material after it came in, and, with the aid of a graduate class in statistical methods, prepared the tables.

Miss Adele McKinnie, one of the permanent members of the Survey Staff, made the estimates of the quality of handwriting.

Other members of the Survey Staff contributed incidentally or performed a part of the laborious calculations involved in preparing the tables.

Dr. Ayres has been intimately associated, as an active worker, with all phases of the report, as has also the author.

MEASURING THE WORK OF THE PUBLIC SCHOOLS

CHAPTER I

PROBLEMS EXHIBITED BY NON-PROMOTIONS

In the latest report of the Superintendent of Schools, it was stated that in June, 1914, 10,000 pupils in the elementary schools failed to be promoted. This is a record of 10,000 educational and social problems. Furthermore, the same report states that nearly 1,400 of these 10,000 pupils were repeating the work of their grades and were, therefore, failing for a second time in the same courses. This means that in 1,400 cases repetition of the work was unsuccessful in overcoming the trouble.

These figures present in a striking way one of the questions which all who are interested in the schools must face. The teachers and principals find, when they try to administer the present course of study to children of the type who attend the Cleveland schools that 10,000 children, or on the average every seventh child, fails for some reason to meet the normal expectation that a half year's work can be done during each semester. The result of non-promotion is that

the schools become congested in the lower grades; children become discouraged and give up trying to do their work; and the whole machinery is clogged by these failures.

If we consider individual cases, we find that there are some children who fail because of lack of native ability to do the work. For such children a mere repetition of the course is largely futile. They ought to be given other kinds of training which will reach their level. Their failure is a sign, and a very clear sign, that they need a change in the course of study.

Again, we find that there are children whose home environment is bad. These unfortunate children cannot find opportunity or encouragement to study. The school is here confronted with an obligation which the community must help it carry even to the extent of providing more and better means for the protection of these children. The time has long since passed when the community can look with any complacence on the failure of a child. Formerly the child was thought of as a culprit when he did not get on in the school, but today it is recognized with all clearness that the community and not the child is most responsible. The community cannot afford to let a child grow discouraged because the discouraged child becomes an unproductive citizen. The community cannot afford to have a pupil held back so that he drops out of school without at least a complete elementary course, for the uneducated child becomes an unskilled laborer. In short, the failure of a child in school because of adverse home sur-

roundings is a large problem in which the community should be more interested than any individual.

So we might go on through the whole list of causes of failure. Every case presents a problem. The business of the school is to see the problem and deal with it. One of the remedies which the school should consider is a change in the course of study. Another is closer supervision and a clearer statement of standards.

This first chapter aims to exhibit the facts regarding non-promotion as they have appeared in recent reports of the superintendent. It is believed that explicit comment on the facts which have thus been published from year to year without discussion will help to make clear a grave administrative problem. It is also believed that vigorous measures should be taken to improve the situation.

Non-promotions are shown, first, by grades, second, in particular subjects of instruction, third, for individual schools. It appears when the facts are tabulated that failures increase with school training, that certain subjects cause so many failures that it is perfectly certain that these subjects ought to be taught in a different way, that the different schools in the system are discordant in their practices and ought to be more completely supervised.

Aggregate Failures in all Grades

Diagram 1 and Table 1 show the percentage of failures in each grade for the whole system and for three successive June promotions. It will be seen that in

June, 1913, there was a failure of 17 per cent of all the pupils in the first grade. In the same year there failed in the second grade only 12.6 per cent.

Attention is drawn to the fact that there has been

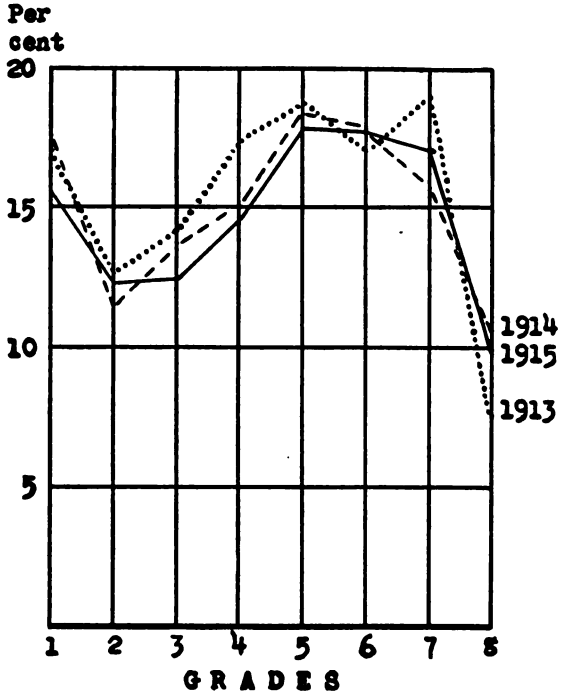


Diagram 1.—Per cent of failures in each grade for three successive June promotions

an improvement in a number of grades in the period covered by these figures. Thus failures in the first, third, fourth, and fifth grades are less in 1915 than in

any previous year. This is a right tendency and is certainly to be commended. Increases in other grades should, for similar reasons, be pointed out as objectionable.

TABLE 1.—NUMBER AND PER CENT OF PUPILS NOT PROMOTED IN THE ELEMENTARY SCHOOLS AT EACH OF THREE PROMOTION PERIODS

Grade		Enrollment	Pupils not promoted	Per cent
2nd Term, 1913	1	11,674	1,987	17.0
	2	8,863	1,117	12.6
	3	8,931	1,262	14.1
	4	8,124	1,406	17.3
	5	7,964	1,490	18.7
	6	6,415	1,057	16.5
	7	5,199	985	18.9
	8	3,924	299	7.6
2nd Term, 1914	1	12,515	2,188	17.5
	2	10,397	1,185	11.4
	3	9,077	1,248	13.7
	4	9,040	1,367	15.1
	5	8,036	1,467	18.3
	6	7,275	1,259	17.3
	7	5,850	918	15.7
	8	4,357	433	9.9
2nd Term, 1915	1	13,108	2,033	15.5
	2	10,857	1,330	12.3
	3	10,562	1,312	12.4
	4	9,328	1,364	14.6
	5	8,902	1,584	17.8
	6	7,259	1,250	17.2
	7	6,429	1,094	17.0
	8	4,903	480	9.8

The high percentage of failures in the first grade is explained by the fact that children have some difficulty during the first year in adjusting themselves to school conditions. It is true almost everywhere in the country that there are many failures in the first grade. It is perhaps too much to demand of the school that this difficulty be corrected at once. The

time will doubtless come, however, when better methods and better adaptation of the course of study will materially reduce failure in this part of the school course. The decrease in percentage of failures in the second grade is also in keeping with the experience of other school systems and indicates that school work is going forward better after the adjustments made in the first grade.

The favorable promise of the second grade is, however, not fulfilled by the subsequent grades. Steadily the third, fourth, and fifth grades show an impressive increase in non-promotions. This means that problems are multiplying and are not being solved. The sixth grade seems to be better, though it will be noted that the situation is no better than it was in the first grade. Furthermore, the apparent improvement in the sixth grade is partly deceptive, because by this grade some children have been eliminated. In the seventh grade conditions grow no better. In the eighth grade the situation is better than elsewhere.

All this is to be compared with the experience of other school systems by saying that it is not uncommon for the records to show at a point in the intermediate grades of the elementary school a slight increase in the number of non-promotions. This rise in the number of non-promotions usually appears in the fourth or fifth grade and is explained by the fact that the work of those grades differs radically in character from the work of the preceding grades. The introduction of geography and the higher phases of arithmetic makes it difficult for children to go on,

even when they have completed satisfactorily the work of the primary grades. This explanation raises the question whether the school ought not to work out a more satisfactory treatment of these difficult subjects; the problem is more urgent in this city because there is a steady increase in non-promotions from the second grade to the fifth.

Mental Incapacity as an Explanation

The Superintendent's published reports contain each year a table showing the reasons assigned by the teachers for non-promotions. The most conspicuous cause of non-promotion is "mental incapacity." The tables for 1913 and 1914, reduced to percentages, are presented in Diagram 2. It will be noted by comparing Diagram 2 with Diagram 1 that incapacity follows the same general lines as non-promotion. One can hardly escape the conclusion that if mental incapacity steadily increases in the third, fourth, and fifth grades, and stands at a high level in the sixth and seventh, there must be some question about the appropriateness of the demands made upon the pupils in these grades. It would be wise to canvass the possibility of revising these demands. It is certainly not in keeping with the natural expectation regarding the public educational scheme that mental incapacity shall increase in the schools.

Failures in Subjects

Non-promotion means, of course, that pupils have not met the requirements of their grades in the par-

ticular subjects taught in these grades. Our study of the problem can, therefore, be carried further by examining the records of pupils in some of the leading subjects in the course of study.

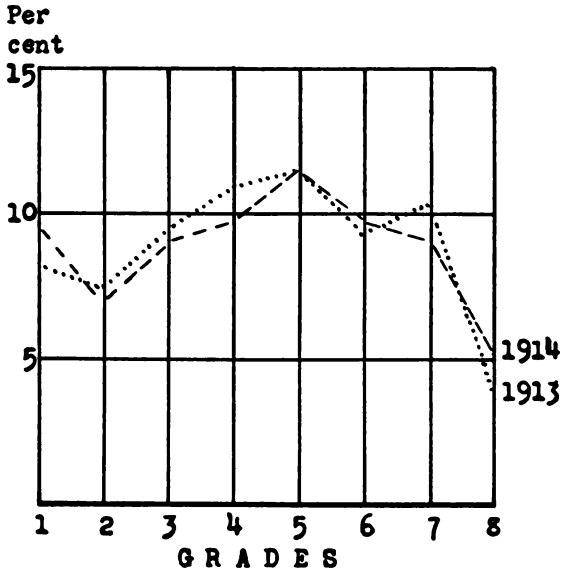


Diagram 2.—Per cent of children not promoted and designated by teachers as held back because of mental incapacity. Data for two successive years

Failures in Reading

Diagram 3 gives the facts with regard to failures in reading, which is one of the most fundamental subjects in the course of study. It will be noted that

there is a very large percentage of failures in the first grade. The percentage drops in the second and third grades, and from this point on the number of

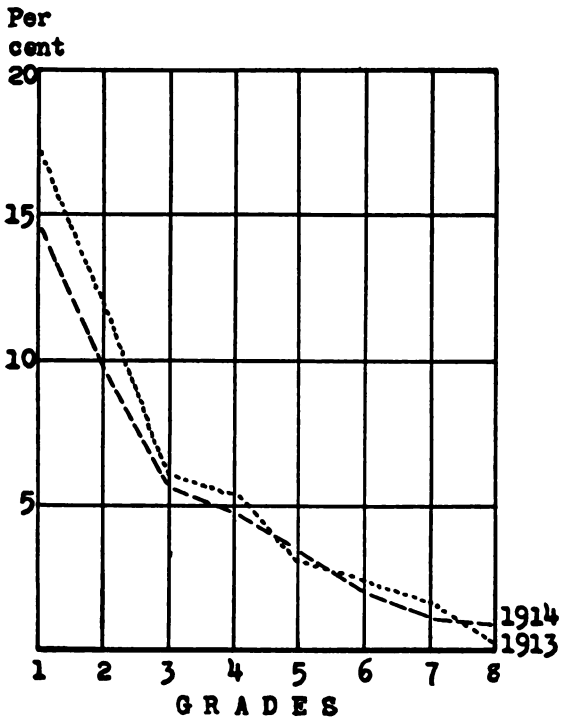


Diagram 3.—Per cent of failures in reading in each grade for two successive years

failures is relatively small and steadily decreasing. This curve represents what would naturally be ex-

pected in any subject which is carried throughout the grades, and is successful in its training of the children. We should naturally expect that the initial difficulties in the study would hold back any one who is likely to develop serious weakness later. We should also naturally expect that the later years of the course would show clearly the advantages of training in the cases of pupils who are promoted and a reduction in the percentage of failures because of the elimination of incompetents which takes place in the earlier years. The results in reading thus stand in sharp contrast with the general results presented in Diagrams 1 and 2. There is no evidence in the records of reading that mental incapacity increases in the intermediate grades. Evidently we may infer from the reports in reading that the schools look upon their work in this subject as in the main successful.

Failures in Arithmetic

The reports on arithmetic are altogether different from those on reading, and bring us back to the striking problems raised by a study of Diagrams 1 and 2. It should be noted that a new course in arithmetic went into operation with the opening of the present school year. The records relate to the old course. Diagram 4 shows the failures in arithmetic. In the first grade only a little arithmetic appeared in the course of study. After this grade arithmetic becomes an important subject, and the number of failures increased enormously through the third,

fourth, and fifth grades. In the sixth, seventh, and eighth grades, there was a decline, although the percentage of failures remained relatively high.

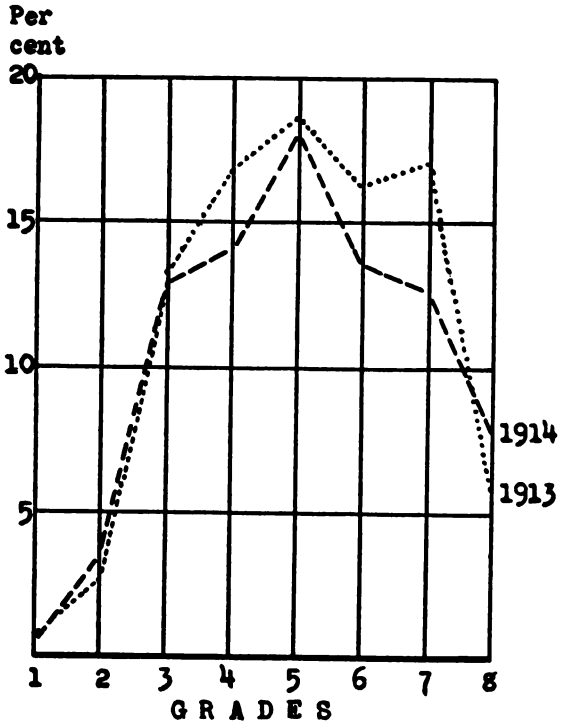


Diagram 4.—Per cent of failures in arithmetic in each grade for two successive years

The striking resemblance between many of the characteristics of this arithmetic curve and those of

the general curve of non-promotion can hardly escape the most casual observer. It is obvious that one of the major reasons for the increase in non-promotions from the third to the fifth grades was the difficulty which children encountered in arithmetic.

As indicated above, the course in arithmetic has been modified, and it is to be hoped that in the future no such record of failures will be possible. The significance of such studies as those which are set forth in this chapter is thus illustrated. If such tables are made up from year to year and adopted as a basis of supervision, those subjects which are giving the children serious difficulty will immediately be recognized. The change in arithmetic is to be commended.

Records in Other Subjects

Figures similar to those which have been given for reading and arithmetic have been tabulated for each of the subjects in the course of study, but space does not permit their presentation. They show that problems like that pointed out in the account of failures in arithmetic are present also in other subjects. The general character of those problems can be seen in Table 2. In this table each subject in which an appreciable number of failures appear is reported. All failures in a given grade were added together and the percentage was computed of failures in each particular subject. Thus in the first grade 92 per cent of all failures were in reading.

This table calls attention once more to the fact

that in the first and second grades reading registers the largest number of failures. From this point on through the seventh grade there were more failures in arithmetic than in any other subject, while in the eighth grade grammar seems to be the most difficult subject to master.

TABLE 2.—PER CENT OF THE TOTAL NUMBER OF FAILURES IN EACH GRADE IN EACH SUBJECT

Subject	Grades							
	1	2	3	4	5	6	7	8
Reading	92	64	27	16	8	5	3	3
Arithmetic	..	22	60	47	42	35	29	28
Spelling	..	..	7	11	7	5	3	4
Language	..	..	6	21	20	14	..	..
Geography	..	..	..	6	23	27	12	10
Grammar	..	..	..	..	..	11	29	33
History	..	..	..	..	..	..	27	23

If we compare this summary table with a table showing the relative amount of time given to the different subjects in each grade, we find that there is remarkable parallelism between the two tables. The one notable exception appears in the fact that throughout all the grades the course of study gives a great deal of time to reading, and yet the number of failures in reading steadily diminishes.

Records of Individual Schools

These facts with regard to non-promotions and failures throw so much light on the general organization and conduct of the school system that it will be worth

while to carry the study down to the individual schools. The moment we do this, we find that there is the most extraordinary diversity in practice. Table 3 shows the facts in full for each school which reported in January, 1915. The table is so arranged as to bring out the differences in per cent of failure from zero to 38.

In presenting this table, it should perhaps be pointed out that the purpose is not to commend or condemn any particular school. The table shows that there is a marked difference between schools. The fact that a certain school reports no failures may be due to lax standards. In one extreme case this seems to be true. On the other hand, excessive failures are difficult to justify. This report must leave the detailed use of this table to the officers who are in charge of routine administration.

TABLE 3.—NUMBER AND PER CENT OF PUPILS NOT PROMOTED IN EACH SCHOOL IN JANUARY, 1915

School	Enrollment	Non-promotions	Per cent
Euclid Park	63	0	0
Kentucky	690	0	0
Miles	565	33	6
Observation	318	18	6
Parkwood	665	46	7
Sowinski	927	68	7
Wade Park	746	53	7
Dunham	758	63	8
Memphis	497	39	8
Bolton	1,033	94	9
Doan	898	81	9
East Madison	972	90	9
Miles Park	685	61	9
Warren	847	79	9
Waverly	578	54	9

TABLE 3.—(*Continued.*)

School	Enrollment	Non-promotions	Per cent
Central	802	84	10
Chesterfield	376	36	10
Fowler	596	57	10
Giddings	818	79	10
Pearl	273	28	10
Willard	1,100	115	10
Addison	529	56	11
Case Woodland	881	94	11
Huck	450	51	11
Rosedale	830	92	11
Sackett	1,105	119	11
Clark	777	92	12
East Denison	551	67	12
Fruitland	302	35	12
Hodge	888	109	12
Mill	505	59	12
Nottingham	531	65	12
Sibley	776	95	12
Dike	955	120	13
Eagle	556	74	13
Mayflower	1,168	146	13
North Doan	795	107	13
Tremont	1,673	214	13
Willson	779	101	13
Woodland Hills	726	98	13
Boulevard	463	67	14
Denison	1,028	141	14
Gordon	605	85	14
Murray Hill	1,338	182	14
Watterson	450	65	14
Dawning	758	115	15
Halle	717	109	15
Landon	753	116	15
Milford	1,221	183	15
Moulton	255	38	15
Scranton	684	106	15
Washington	242	36	15
Broadway	838	136	16
Case	698	109	16
Columbia	1,131	176	16
Hazeldell	956	150	16
Kennard	964	153	16
Lawn	526	86	16
Memorial	800	128	16
Outhwaite	1,252	202	16

TABLE 3.—(*Continued.*)

School	Enrollment	Non-promotions	Per cent
South	826	132	16
Tod	450	74	16
Wooldridge	1,144	184	16
Hicks	1,000	174	17
Marion	744	127	17
Orchard	956	161	17
Warner	457	77	17
Woodland	1,041	176	17
Barkwill	581	106	18
Fairmount	590	104	18
Harmon	674	120	18
Hough	842	149	18
Kinsman	1,552	278	18
Lincoln	841	152	18
Walton	743	136	18
Brownell	941	179	19
Mound	576	111	19
Mt. Pleasant	639	122	19
South Case	1,032	196	19
Stanard	593	113	19
Waring	635	123	19
Detroit	626	124	20
Buhrer	608	127	21
Quincy	757	157	21
East Clark	379	84	22
Gilbert	901	208	23
Harvard	609	138	23
Union	948	232	24
Fullerton	715	177	25
Alabama	317	86	27
St. Clair	740	229	31
Sterling	765	234	31
Rockwell	158	51	32
Rice	1,382	463	34
Longwood	704	269	38

Table 4 is added so as to show that the differences at the extremes of the table are not purely accidental and confined to January, 1915.

TABLE 4.—PER CENT OF PUPILS NOT PROMOTED IN EACH OF FIVE SCHOOLS AT EACH OF FIVE PROMOTION PERIODS

School	Promotion period				
	Jan., 1913	June, 1913	Jan., 1914	June, 1914	Jan., 1915
Kentucky	0	0.1	0.3	4	0
Observation	0	11	13	12	6
Rockwell	33	17	20	28	32
Rice	40	28	37	26	34
Longwood	29	21	24	27	38

One explanation offered by officers of the system is that the school which fails most pupils has a population which is backward. The question immediately arises: Is non-promotion the method of treating backward children? Ought not the system to adopt some wholly new attitude, such as that suggested by its change in the course in arithmetic?

This demand for readjustment becomes even more impressive, however, when it is recognized that many of the schools cannot explain their practices by any peculiarities of the children. It is evident that many of the fluctuations are due to the adoption of wholly discordant standards by teachers and principals.

Records for a Period of Years in Particular Schools

Another significant body of facts appears when the records for all the grades in a given school are compared for a period of years. Striking examples of

histories that differ radically in character are found if we consider Gordon and Doan for the last five periods of promotion. Diagram 5 and Table 5 show how the Gordon School has fluctuated, reaching extremely high and low records within a relatively brief period.

TABLE 5.—PER CENT OF PUPILS NOT PROMOTED IN GORDON SCHOOL AT EACH OF FIVE PROMOTION PERIODS

	Grades							
	1	2	3	4	5	6	7	8
Jan., 1913	28	21	25	29	40	24	25	19
June, 1913	14	14	28	31	22	26	29	10
Jan., 1914	21	9	15	14	8	6	8	0
June, 1914	12	4	0	7	14	16	19	5
Jan., 1915	20	11	11	7	14	15	21	9

The same diagram and Table 6 show that Doan has followed a fairly consistent policy during the same period and also that this school has had in most cases fewer non-promotions than Gordon.

TABLE 6.—PER CENT OF PUPILS NOT PROMOTED IN DOAN SCHOOL AT EACH OF FIVE PROMOTION PERIODS

	Grades							
	1	2	3	4	5	6	7	8
Jan., 1913	11	7	13	11	9	13	16	9
June, 1913	7	13	10	14	5	22	18	11
Jan., 1914	9	8	15	14	17	13	6	6
June, 1914	11	6	10	9	20	18	7	2
Jan., 1915	14	8	6	14	9	8	7	5

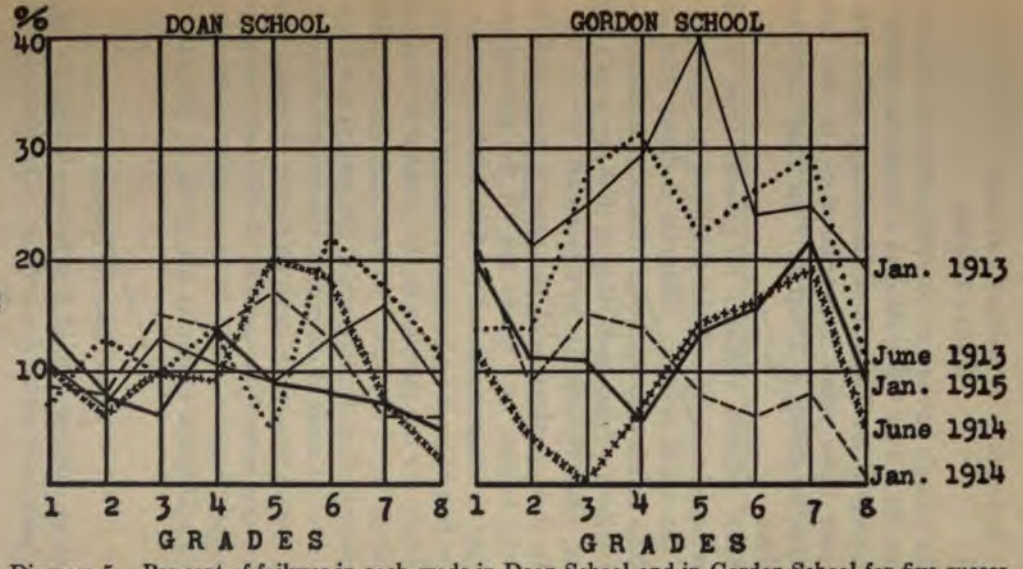


Diagram 5.—Per cent of failures in each grade in Doan School and in Gordon School for five successive promotion periods

Individual Schools Compared with the Whole System

Some schools have more non-promotions in the early years than does the system as a whole, as shown in Diagram 6 for Eagle and Broadway, while other schools show more non-promotions in the later grades, as shown in Diagram 7 for East Clark and Buhrer.

Some schools conform in general type to the scheme of non-promotions exhibited in Diagram 1 for the whole system. Diagram 8 shows Rice and Bolton which thus conform. These two schools differ strikingly from each other in that one is at a high level, while the other is at a low level.

In sharp contrast with the general type exhibited by the system as a whole are all the schools presented in Diagrams 6 and 7. These schools make it clear that there is no inherent necessity in the course of study for the increase in the number of non-promotions from the third to the fifth grade, which appears in Rice, Bolton, and in the system as a whole. In order to make it clear that the scheme shown by the system as a whole is by no means necessary, two more diagrams from schools of different sizes and locations may be added to those already discussed. Such additional examples are given in Diagram 9.

Variations in Grades

A close examination of the figures brings to light fluctuations in particular grades. The most striking

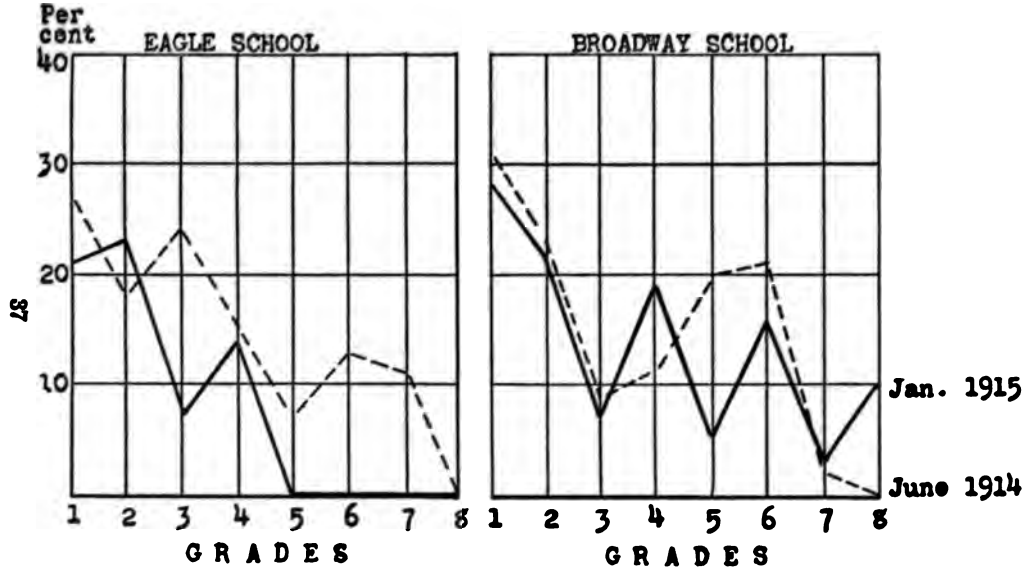


Diagram 6.—Per cent of failures in the Eagle and Broadway Schools for two successive promotion periods

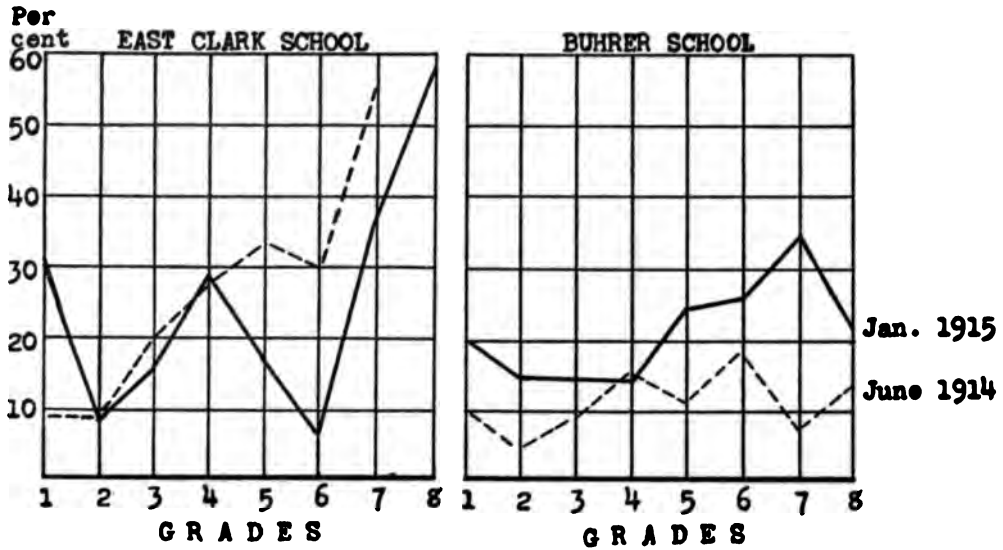


Diagram 7.—Per cent of failures in the East Clark and Buhrer Schools for two successive promotion periods

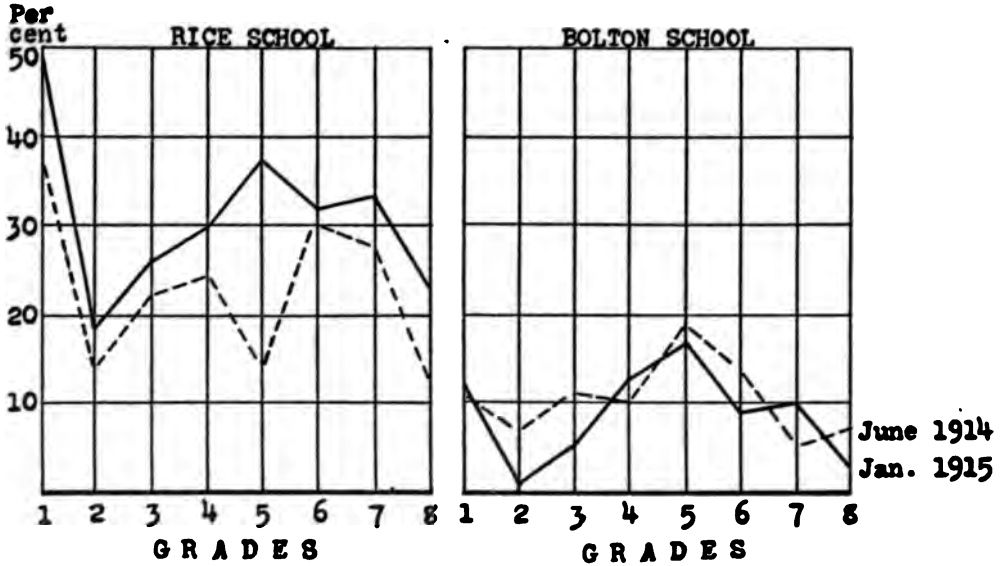


Diagram 8.—Per cent of failures in the Rice and Bolton Schools for two successive promotion periods

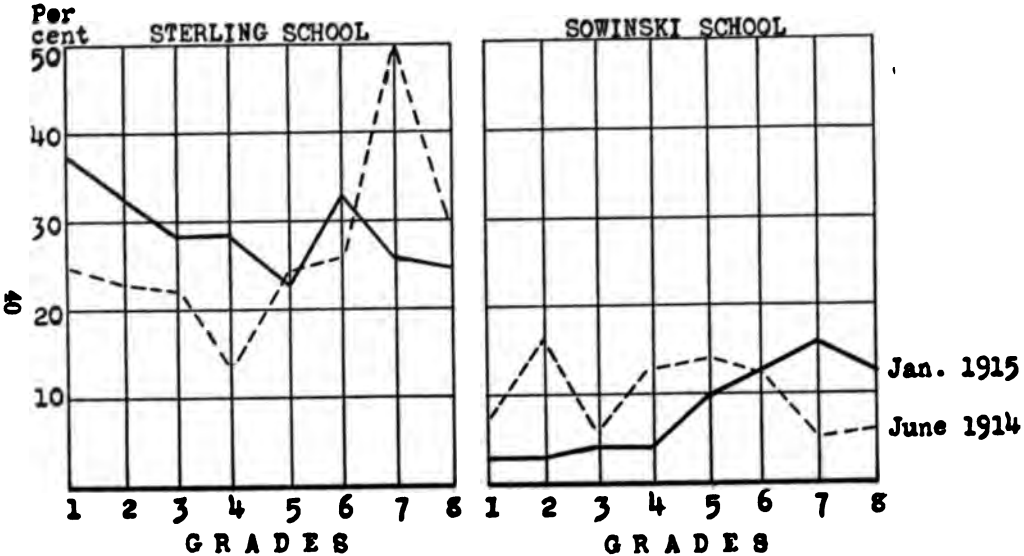


Diagram 9.—Per cent of failures in the Sterling and Sowinski Schools for two successive promotion periods

example is the Rice School fifth grade. Here the two periods of promotion show decided opposition in tendency, and the grade stands out in each case as different from the grades immediately preceding and following. A like statement may be made regarding the seventh grade in Buhrer, and the third grade in Eagle.

The Need for Scientific Supervision

It is perfectly clear that the facts of non-promotion show a lack of complete organization and unity within the school system. An analysis like that on the earlier pages of this chapter represents a type of supervision, based on fact, which must come in every school system. There was a time when small school systems and relatively simple courses of study could be governed and supervised by central school officials who could keep under direct personal observation all the activities of the teachers. Opinion was the basis of action. That time has passed. In a system of one hundred elementary schools, methods of supervision must be worked out and put in operation which are impersonal. Cleveland should at once set up the administrative machinery for making constant, exhaustive studies of non-promotions and of other problems of a similar nature. There is a special technique of administrative inquiry which should be cultivated in school systems, as it is being cultivated in all great business concerns. Money spent in central administration is well spent if it produces a system of scientific general supervision.

Discussion of Remedies

After the facts are understood, remedies will have to be devised. It would be easy for this report to recommend specific measures of relief, but it is a grave question whether it is in place for a survey to interfere with administration. Future action will be intelligent only if it is based on further close scientific studies which follow step by step each administrative device. It would be inconsistent for the Survey, which advocates scientific methods of supervision, to lay out a program that would in any wise handicap administrative officers who will know next year better than it can now be prophesied what will be the effect of this or that action.

Negative Recommendation

One negative recommendation can be made without hesitation. It would be an egregious blunder to attempt to change the present condition by any arbitrary edict enforcing uniformity. The present situation is the product of many personalities and many tendencies. Harmonious unity can be secured only as a product of prolonged systematic training of all who are concerned.

Indirect Methods of Educating Teachers

One indirect way of improving conditions would be to begin a campaign of general education by appointing a committee of supervisors and principals to can-

vass the matter in detail and report rules of action to the teaching body. Another similar educative method would be to take some member of the central supervisory staff away from the routine in which he now serves and make it his duty to study the problem and arrive at a plan for controlling and directing the action of teachers and principals.

Changes in the Course of Study

A more direct method of attack is to extend revision of the course of study. There are too many failures in several subjects. Much non-promotion would probably be cured if the course were made richer in content so as to interest pupils more and stimulate them through interest to greater effort. Finally, if children get no benefit from repeating standard courses, irregular courses should be organized with much handwork and play adapted to the capacity of such pupils.

These suggestions are intended merely to reinforce the impression made by the analysis of non-promotions. Whether one or the other of the suggestions is accepted, it is certainly imperative that some change be made in the promotion situation.

Summary

1. This chapter shows that there are a great many non-promotions in the grades and that they increase rather than decrease with the progress of school work.

There is an astonishing increase of so-called mental incapacity through the intermediate grades.

2. The rate of failure in reading declines steadily as children pass through the grades, while in arithmetic there was, and in certain other cases there is, a very heavy increase as the work progresses from grade to grade.

3. In the matter of non-promotion certain schools show an impressive lack of accord with each other and often with their own past practices.

4. All this shows the necessity for a new type of scientific supervision and administration which shall constantly bring to the consciousness of school officers and of the community the chief problems of school organization through comparative studies and tables of definite facts.

CHAPTER II

OBSERVATIONS IN THE SCHOOLS

As a preliminary to more exact studies of the results of classwork, members of the Survey Staff visited all the schools of the city. Table 7 on page 46 shows the number and distribution of these visits, 1,553 in number.

Methods of Recording Visits

Each visit was recorded on a card. The upper part of the card, after locating the visit by school and date, described the visitor's first impression about the physical conditions of the building. Then came a description of the pupils and their reactions. Third, the teacher and the methods employed in instruction were reported. Finally, there were remarks on the course of study, the character of supervision in that school, and matters in general. These cards were filed in the office of the Survey. Whenever a specialist studying some other phase of the work came to join the Staff, these cards gave him an opportunity to learn something of the instructional side of the work. Whenever something of special interest about a school turned up, the cards were consulted for further light or for confirmation. In some cases repeated visits were made.

TABLE 7.—RECITATIONS ON WHICH WRITTEN REPORTS WERE MADE BY MEMBERS OF THE SURVEY STAFF

Elementary schools	
Reading	453
Arithmetic	146
Language	83
Domestic science	57
Geography	52
Spelling	44
History	42
Manual training	30
Writing	27
Physical training	25
Music	19
Sewing	11
Sense training	10
Drawing	9
Nature study	8
Supervised study	8
German	7
Physiology	7
Unclassified	5
Total	1,043

Evening schools	
Shop work	21
English	12
Drawing	8
Dressmaking	8
Arithmetic	7
Reading	7
History	4
Millinery	4
Grammar	3
Agriculture	2
Chemistry	2
Geography	2
Spelling	1
Total	81

High schools	
English	34
Domestic science	18
Drawing	18
German	16
Shop work	16
Civics	15
History	13
Latin	13
Physics	11
Geometry	10
Algebra	9
Bookkeeping	9
Manual training	9
Physical training	8
Physiology	8
Arithmetic	7
Geography	6
Chemistry	5
Supervised study	5
Typewriting	5
Botany	4
Oratory	4
Printing	3
Writing	3
Banking	2
Salesmanship	2
Total	253

Special classes	
Backward	34
Defective	33
Deaf	20
Industrial	15
Cripple	14
Blind	13
Training centers	13
Boys' school	12
Steamer	11
Open air	10
Epileptic	1
Total	176

Foreign Children

Cleveland schools have a very grave problem in the number of children from homes where the influence

of European life is still very strong. The problems which grow out of a lack of English training at home are numerous and urgent. In some cases these problems were not faced in the right spirit. The word "foreign" in the mouths of some teachers, and of some persons in other walks of life, is synonymous with all that is socially and economically deficient. Some teachers whose methods are weak and whose knowledge of human nature is limited try to throw the responsibility for poor classwork on foreign children. On the other hand, it is gratifying to report that again and again the observation was made that skilful teachers, working with methods suited to the children, were finding that foreign children are often the brightest children. Schools were seen where the processes of Americanizing and educating were going on at a most commendable rate and under the guidance of skilful teachers who were exhibiting endless patience and ingenuity.

Such observations suggest several comments. Especially in the lower grades it is evident that the reading matter supplied to foreign children is often ill adapted to their needs. Selections from the classics of England and the United States are hardly intelligible to children from homes where other traditions are still alive and where the urgent call of the simplest material needs dictates the daily conversation. Admitting at once that it is desirable to bring the children ultimately to an appreciation of our traditions, would it not be better to begin with reading matter less difficult to understand?

One sometimes wonders how long it will be before the skill and ingenuity of teachers will be turned to the making of new types of reading matter. It would in many cases be better to read from papers written by the children than to be restricted to formal reading from the books now at hand. These books were made at best for children coming from homes where English is familiar.

Attention to the needs of foreign children ought to bring into the schools more studies of a social type which will acquaint all the children with the organization of the city and the duty of the individual to the community. Many such studies could profitably be prepared by the pupils themselves.

Emphasis on Traditional Subjects

Even the casual visitor in the Cleveland schools notices the great emphasis which is laid on the traditional subjects. The course of study has been very little expanded. This is sometimes expressed in the statement that "Cleveland has not gone after fads." So conservative has the system been that many new and productive lines of work have not been taken up. One gets the impression that a great deal of formal drill work is done in the schools, and that it is very well done. But it is doubtful whether drill in traditional subjects is to be accepted as of higher value than introduction to an enriched curriculum. In the light of present-day experience, the present course of study appears to be narrower than Cleveland ought to

have and the emphasis on formal training is excessive.

Behavior in Classes Excellent

One fact noted on all sides is that the order in most schools is excellent. The children seem to be docile and willing to do what is asked. To be sure, there is at times a lack of spontaneity and enthusiasm; but quiet, orderly conduct was everywhere the rule.

Fluctuations in Quality of Teaching and Supervision

An impression which was reported by every observer is that the quality of the instruction exhibited throughout the system is very uneven. Here and there some teacher stands out as full of energy and as thoroughly in command of his or her sphere of action. On the other hand, some cases of teaching were observed which are so bad that it is surprising to find them in the system.

It is one of the most important tasks of the superintendent and his assistants to select teachers for the system. It is one of the chief duties of the principals to make teachers better by watchful supervision and helpful criticism. It is often necessary for the good of the schools to eliminate teachers who are not able to do satisfactory work.

Such general statements as those in the last paragraph might be expanded almost without limit. The selection of teachers is difficult because the supply of

well-trained applicants is not sufficient. The task of removing teachers who are incompetent calls for courage and for positive evidence that work is not going forward satisfactorily.

This means in turn that the supervisory officers of the system must be clothed with power in this matter. They must be supplied with the necessary time and organization for securing candidates and for establishing their judgments. They must also be energetic in securing satisfactory conditions in these respects.

The problems here outlined are of such importance that one section of the Survey Report is devoted to "The Teaching Staff." At this point it is necessary to record the judgment of the observers of the Survey Staff that there is more poor teaching in the schools than is tolerable. Especially is there an unusual amount of poor teaching observable in the high schools.

It will be the duty of this report to refer in later paragraphs to evidences of poor teaching which are somewhat more convincing than any descriptions which could be recorded here, but observations were put on file by the members of the Staff which call so loudly for definite strong administrative action that they cannot be overlooked.

Observations on Supervision

If the foregoing statements regarding the responsibility of supervisors are legitimate, then observations

regarding the activities of these officers are doubly significant. It is the judgment of the Survey Staff that supervision is one of the weakest phases of the school system of Cleveland. There are principals in both the elementary and the high schools who are without sufficient training for their duties, without adequate information as to what is going on about them, and without comprehensive grasp of educational problems. Many of the elementary principals have had little contact with the current educational movements. Many of them have been in the system for a long, long time and are conducting the schools today on the basis of opinions about school organization which originated before the stirring developments in education which have brought new and better equipped buildings, a richer course of study, and scientific methods of supervision. The high school principals spend too much time and energy in the discussion of matters that smack of competition between different high schools. In the mean time it is obvious that the high schools of Cleveland are very much in need of supervision. Good supervision would eliminate some of the very bad teaching that was seen and would unify the high school system so that it would become a co-operating system of institutions. At present it is not such a system.

Dearth of Men in Elementary Schools

Another impressive characteristic of Cleveland is the dearth of men in the elementary schools. The boys

of Cleveland suffer by not having men to consult, especially in the upper grades. In other sections of the report the salaries paid to principals are discussed. Men would cost more than Cleveland is now paying for elementary principals. The investment would undoubtedly pay.

Little Departmental Teaching

One of the forms of instruction which has been very commonly adopted in the cities of the United States, but has found little place in Cleveland, is departmental teaching in the upper grades. It is reported as present in 13 schools. As a preparation for the general change which was inaugurated with the organization of the junior high school in September, departmental teaching on a more general scale would be most advantageous. Furthermore, it permits and encourages a degree of differentiation of the course of study in the upper grades which adapts the course to the needs of individual pupils. Cleveland's upper grades are more rigid and traditional than are those in many progressive cities.

Necessity for Interchange of Professional Experience

The question of how improvement may be secured is not easy to answer. One observation was repeatedly made. Teachers seem to work in isolation. The question was often asked, "Have you visited some

other school?" "Do you know such and such a method?" The answer was usually disappointing. It seemed to the observers that Cleveland teachers as a class are not stimulated by professional contacts with each other and their supervisors as much as they should be. Why should not the grade teachers of a given district work out together some real problem? Problems there certainly are. The foregoing chapter made that clear. This plea for professional relations should not be misunderstood. It is not suggested that teachers listen to more speeches. It is suggested that they be given something to do in the way of enlarging the course of study and critically revising present methods of instruction.

Central Supervision

One other matter which falls under the head of comment rather than under the head of observation in the schools may be formulated in the statement that the central administrative officers who are in charge of the schools have in their hands a great body of information which lies undigested year after year. The statistical department is burdened with requisitions for supplies and there is no surplus energy to do more than collect and tabulate reports. Cleveland has a body of statistical material now on hand which is not paralleled for richness and value anywhere in the country. This material ought to be used for administrative purposes and not merely published from year to year without comment.

As pointed out in the first chapter, a city system of the size of Cleveland has long since outgrown the possibilities of control through personal contacts and individual observations on the part of supervisors. The central educational offices must be made aware of conditions within the system by a stream of clearly arranged and well-digested reports. It appears at the present time that there is a lack of constant interpretation of the schools' needs. One hears in reply to questions about various matters that these matters are in abeyance because other matters no more important are absorbing all available energy.

For example, questions regarding the high schools have been met by statements that the administration has been too busy with other matters to deal with them. This indicates that there is a lack of vivid realization at the central office of the necessity of supervising and unifying the high schools. The high schools cannot wait for the organization of the grades. This is an example of the urgent necessity that supervisory methods be worked out which are adequate to the system as a whole. At present this complete central control does not exist. Other examples will be brought out in subsequent chapters where it will be shown that the administration of teaching is in urgent need of reorganization. The principals, as indicated above, need stimulation and improvement. All these demands point to the need for a more vigorous policy at the central office.

Summary

This chapter reviews briefly the observations made by members of the Survey Staff.

1. Cleveland has a difficult problem because of the large foreign element in its population.
2. The course of study is very conservative and needs revision.
3. Instruction is of very uneven quality.
4. Supervision is one of the weakest phases of the Cleveland system.

CHAPTER III

TESTS AND STATISTICAL STUDIES

As soon as the visiting of classes was well under way, the Survey Staff asked the Superintendent and the teachers to co-operate in bringing together a body of material which should exhibit in detail what was going on in some of the simpler phases of school work. This request met with a most cordial response and papers were collected showing the ability of pupils to write, spell, and work out simple arithmetical combinations. Tests were also carried on by the teachers and others in reading. The principals prepared certain reports, especially full reports of the standings of all pupils in the eighth grades and high school. This co-operation brought to hand abundant evidence on which to base a wholly impersonal view of the classwork of the schools. In the following chapters this evidence will be recorded and interpreted.

The collection of examples of school work on a large scale has long been recognized as a helpful method of disseminating good methods. Every exhibit of schoolroom work is an effort to compare the products of different grades and different schools with a view to promoting a higher general grade of

work. Tests are the legitimate descendants of the school exhibit. Material is gathered from many schools and tables of comparison are made up which show the general average of achievement, the excellence of the best schools, and the deficiencies which should be corrected.

Tests Show Wide Variations in Grades

The impressive fact which always stands out in examining the results of a series of tests is the need in schools of more definite standards of work. Teachers are working in ignorance of what they ought to accomplish and of what others are accomplishing. The tests which are to be reported in the following chapters show in every case that there are wide variations between the grades in different schools. Thus the fifth grade in one school spells a certain list of words with the high average of 88 per cent, while three fifth grades in other schools spell the same list with the low average of 58 per cent. In measurements of handwriting it was found that one fifth grade writes more than twice as fast as another and one shows twice the excellence in quality shown by another. In arithmetic and reading there are wide differences. This is true, be it noted, of whole grades. The school system is treating the various fifth grades of the city as if they were alike, when the fact is that they are very far apart.

Tests Reveal Lack of Definite Aims at Many Points

Second, every test shows that progress from grade to grade can be clearly defined. When the results are put together, they show that there is a law of progress. Once the law is exhibited, it is possible to judge how far individual schools conform. That this method of checking school work has not been used by teachers and supervisors appears from the erratic and often retrograde scores made by successive grades in the same school. Thus the fourth grades in Cleveland schools average less well than the third grades in ability to interpret what they read. Certain schools overemphasize speed in writing, while others overemphasize perfection of form. In arithmetic, some sixth grades fall below the fifth grade in the same school and even below the fourth grades in mastery of the fundamental operations.

Tests as a Basis of Administration

No school system can free itself entirely from the difficulties which are so clearly revealed by these tests and comparisons. The children in different schools differ one from another, teachers of different degrees of efficiency are sure to be found in all parts of the system. The findings of the following chapters should not be interpreted as a demand for uniformity. The true interpretation of these chapters may be formulated in the statement that the standard of one school should be constantly compared with the

standards of other schools with a view to substituting definiteness of aim for indefiniteness and with a view to rendering supervision exact and impersonal.

Every school system should make comparative studies the basis of supervision. In a certain sense this has been done in the past by the supervisor who has visited from room to room to impress on teachers the standards which in his judgment are proper for each school. Comparisons of this type must be superseded in a great school system by more general comparisons and by comparisons more nearly exact in method. The motive of the Survey is to exhibit the need of such exact general comparisons so vividly that the community will be prepared to support a continual survey of all the work done in the schools.

The Meaning of Criticism

It becomes necessary at times in reporting the results of the tests to criticize the schools which are below the average, or are irregular in their instruction. This is a duty which cannot be evaded. As pointed out in the preceding chapter, it is the judgment of the Survey Staff that immediate improvements are possible in a number of lines and ought to be demanded. The evidence that improvement is possible has been found in the fact that neighboring schools and grades are now doing superior work. Every adverse criticism based on comparison thus implies praise of the good schools and the excellent work which furnished the basis of comparison. It is to be hoped that this

fact will not be lost to view in the presence of the urgent pleas for improvement which will be made in subsequent pages.

Convergence of Various Lines of Evidence

One final statement should be made. After the tests were completed certain schools were visited a second time to discover, if possible, the explanation of striking results. Furthermore, the observation cards were carefully compared with the results of the tests. The various lines of evidence agreed so closely that the conclusions of this report are offered with the utmost assurance. It is not possible to present in full the cases where convergent lines lead to the same final judgment, but again and again wholly independent observations and tests showed that it is entirely possible to determine with a higher degree of scientific accuracy the measure of efficiency in educational processes.

Summary

This chapter serves as an introduction to a series of statistical studies of the simpler phases of school work. All tests agree in pointing to the conclusion that there are wide divergences between grades of the same denomination, and marked differences in the kind of progress shown by children as they pass from grade to grade in different schools. These showings lead to the recommendation that a vigorous policy of comparative study be adopted as a regular part of routine administration.

CHAPTER IV

TESTS OF HANDWRITING

It is relatively simple to gather samples of handwriting from all the schools. This was accordingly undertaken as the first test of the series.

Uniform Conditions

Even in the case of handwriting, it is necessary, if the results are to be compared, to secure material that is produced under conditions as nearly uniform as possible. The teachers who were to administer the test were therefore asked to prepare for the test in advance by requiring the children to memorize a familiar passage so that they might write the words without the distraction which would come from attempting to write from dictation or from copy. The first three sentences of Lincoln's Gettysburg speech were used for this purpose. When the day for the test arrived, all the children in the fifth to the eighth grades were asked to write as much as possible in exactly two minutes.

Complications Encountered in Writing Tests

It may be remarked that any kind of sentences which are used are likely to interfere somewhat with the

accuracy of the test. For example, it was found that wherever a long word occurred at a critical point in these sentences, it influenced the amount of writing done by a given child in a given time, because the child would show some reluctance to undertake the writing of a long word, especially near the end of the two minutes. In the aggregate, this reluctance affected the number of letters written per minute. On the other hand, if there were a few short words remaining in a sentence which was nearly completed at the end of two minutes, the children evidently took an extra few seconds beyond the time allowed to finish up. On the whole, it seemed better, however, to take sentences containing a variety of different words and a variety of different letters rather than to repeat words or write disconnected letters.

Another complication arose out of the lack of experience on the part of some teachers in giving tests. When the test was abnormal in any way, it was usually possible to detect the fact because of the departure of the results from the general type. In some instances, therefore, the test was repeated after consultation with the principals. The final results may be relied upon, therefore, as showing with a fair degree of precision how many letters can be written by each child in two minutes.

The difficulties encountered in administering this test are commented on at length because they illustrate strikingly the false attitude which is taken at the outset by many who do not understand the value of tests. Some teachers assume that they must help

the children to get an abnormally high score. They look on the test as a kind of competition. The fact is that tests should be regarded as means of getting at the normal facts. A fifth grade that is reported as writing abnormally fast is not thereby shown to be an efficient class. Probably such a class will be found to have neglected some other desirable kind of training in securing the extraordinary result.

Scope of the Cleveland Test

Specimens were collected from 25,387 children in the fifth to eighth grades. For purposes of this report a part of the results were worked up in full. About 10,000 of these results were used. They were taken entirely at random, and since they were drawn from 36 schools, they may safely be regarded as representative of the whole system.

Speed in Various Grades

Diagram 10 shows the average results for the four upper grades in 36 schools. The figure is to be interpreted as follows: In the upper diagram, which gives the results for the fifth grades, there are numerous small squares, each representing a single fifth grade. In each square is a number showing the average number of letters written per minute in a grade. Thus in the square at the extreme left of the diagram is the number "39." This means that the average number of letters written per minute by that fifth

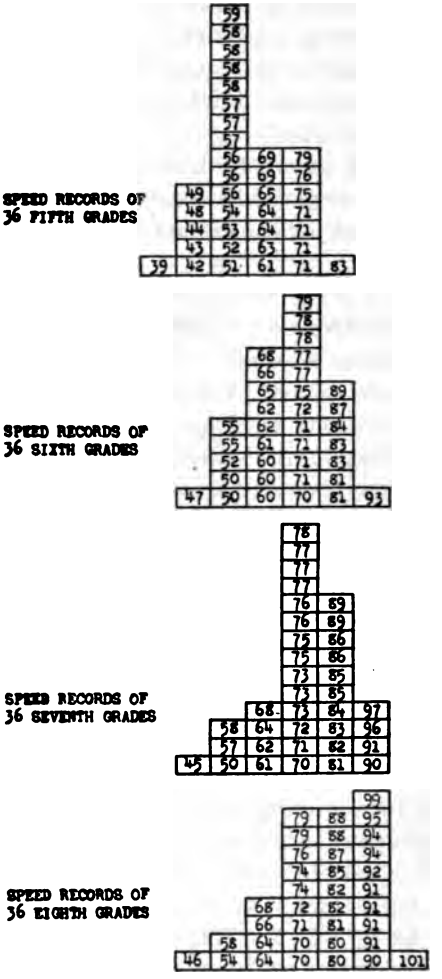


Diagram 10.—Average handwriting speed in letters per minute in four upper grades of 36 schools

grade was 39. In the next vertical column of squares there are numbers ranging from 42 to 49. These indicate that there were fifth grades showing each of the averages given.

One of the most impressive facts which is brought out by this comparison is that the slowest fifth grade is only half as fast in its writing as the fastest fifth grade. Like statements can be made regarding the other grades. These wide differences cannot be attributed to any native characteristics which the children bring to the school. Such disparities might appear in individuals, but the figures report whole grades. All the fifth grades are going through the schools parallel with one another and are officially ranked as alike. The same statement can be made regarding the other grades also. Perhaps the most obvious case is that of the eighth grade. Children will go out of the various eighth grades into high schools with the official assumption that they are equally well fitted for advanced work, and yet one eighth grade averages only 46 letters a minute, and another averages 101. Is it not evident that there must be a difference in emphasis on speed in writing in different schools?

Another fact of importance comes out when successive grades are compared. Among the fifth grades the largest group lies between 51 and 59. In the sixth grade there is a very marked movement of the majority of the records toward 70 or more letters per minute. Especially is it to be noted that the lower records tend to drop away in the higher grades.

Standards Actually Accepted in Schools

Such a comparison gives what may be called the real standards of speed of handwriting for the Cleveland school system, and it serves to show how variable the standards of individual teachers are. The best fifth grade is better in speed than the average eighth grade, and a similar overlapping is found in the records of all grades. This means that, so far as speed in writing is concerned, the better half of the fifth grades could change places with the poorer half of the eighth grades without doing violence to the real standards of the two grades.

Individual Rates

For some purposes it is important to locate an individual as well as the grade. The facts from all the records handed in are accordingly compiled in Diagram 11. It will be seen from this diagram that individuals vary from a rate of less than 10 letters per minute to a rate of more than 120 letters. The larger numbers of individuals write from 60 to 80 letters. The fact that so symmetrical a figure appears when all grade lines are ignored teaches an impressive lesson of the necessity of a new study of the meaning of our grading system.

Method of Rating Quality

Up to this point only speed has been considered. More important than speed is quality. It is, how-

ever, a more difficult task to determine the quality of a specimen of handwriting. The device in common use for such rating is to compare a given specimen

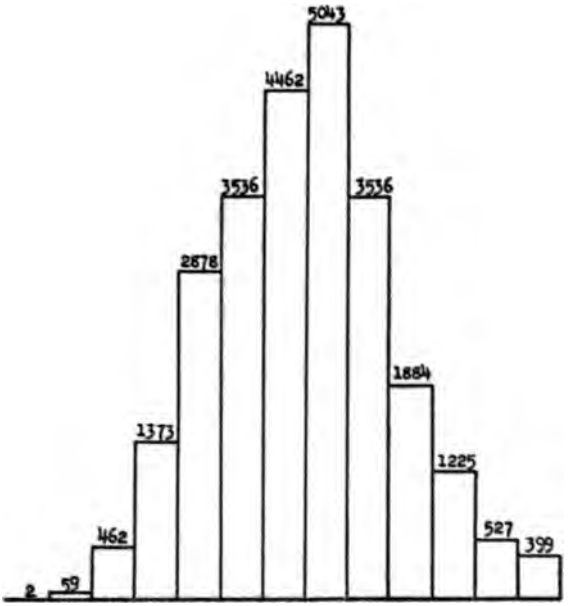


Diagram 11.—Number of pupils writing at each speed from 0 to 9 letters per minute to 120 to 129 letters per minute. Data for 25,387 pupils in four upper grades

with a series of specimens which have been arranged in order of legibility.* It would be possible to get a

*The Ayres scale was used. Full references are given in the Appendix.

scoring for quality by comparing the Cleveland specimens with one another and grading each with such marks as "excellent," "good," etc., but the use of a standardized series has been found to give greater precision to the ranking, because judgment is supported by constant references back to the standard series of specimens. It also makes possible comparison with writing in other school systems. Furthermore, the standard series of samples has been so arranged that the successive steps upward in quality may be regarded as equal. The satisfactory rating of specimens depends on some practice even when the standard series is used. As a matter of practical procedure the Survey Staff spent some time and effort training a group of Cleveland teachers in the rating of specimens of handwriting. For the purposes of this report, however, 10,528 specimens were graded by a member of the Survey Staff especially trained in the work.

Variations in Quality

Diagram 12 shows in a manner similar to that explained in the earlier paragraph on speed the results obtained from 36 schools. From the figure it will be seen that in quality, as in speed, the most striking variation exists between grades which are officially recognized as parallel. Furthermore, there is the same overlapping of grades, several of the fifth grades ranking higher than the average eighth grade.

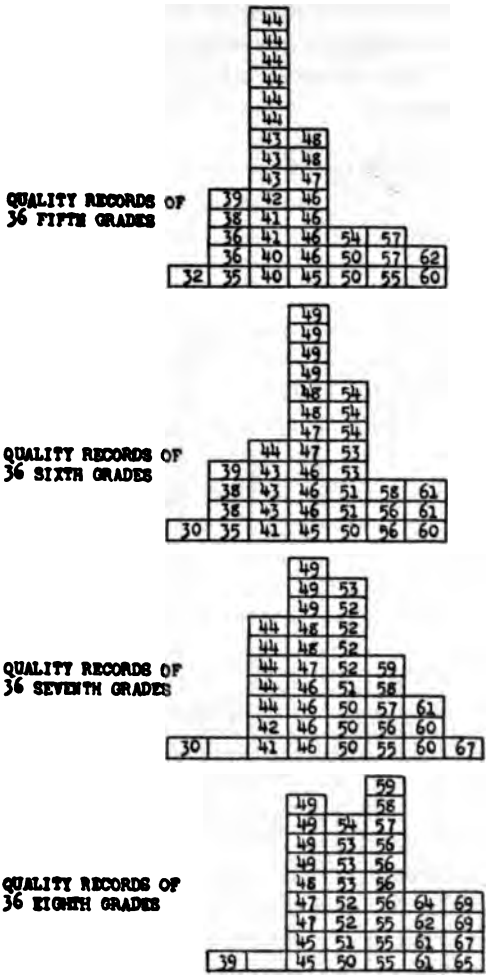

QUALITY RECORDS OF 36 FIFTH GRADES
QUALITY RECORDS OF 36 SIXTH GRADES
QUALITY RECORDS OF 36 SEVENTH GRADES
QUALITY RECORDS OF 36 EIGHTH GRADES

Diagram 12.—Average quality of handwriting in four upper grades of 36 schools

Individual Records of Quality

Diagram 13 reports all the individual variations in quality. Table 8 gives all the results utilized in this chapter.

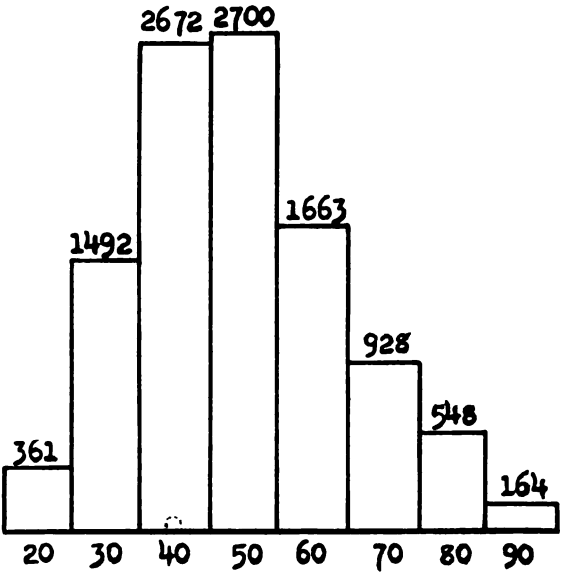


Diagram 13.—Number of pupils writing at each quality from 20 to 90. Data for 10,528 pupils in four upper grades

Relation of Speed and Quality

After determining the speed and quality of each specimen, it becomes possible to work out with great exactness the relation between these two characteristics. It is evident from ordinary experience that

quality commonly deteriorates when speed is emphasized, and that speed is slow when one tries to write especially well. The school is constantly in the position of seeking some reasonable balance between speed and quality.

Diagram 14 gives the facts for the 10,528 specimens carefully studied. In the vertical axis of this diagram are represented the different speeds; in the horizontal axis are the various grades of quality. The results from each grade are represented separately. Thus, beginning at the extreme right end of the bottom line, we see from the diagram that for those writers in the fifth grade who show the highest quality (90) the rate is on the average 51 letters per minute. Advancing along the line toward the left, we find that those in the fifth grade who show a quality of 80 have an average speed of 54 letters.

The diagram shows that there is a general area between qualities 60 and 80, and between speeds 60 and 80, where all the grades above the fifth may be said to reach a level. Greater speed seems to be purchased at an undue sacrifice of quality, and higher quality seems to result in much slower speeds. We thus have in our results some indications as to the probable area within which teachers will find a desirable balance between speed and quality.

Standards Derived from Experience

Every teacher in the grades has some kind of a standard of speed and quality of penmanship. Each time

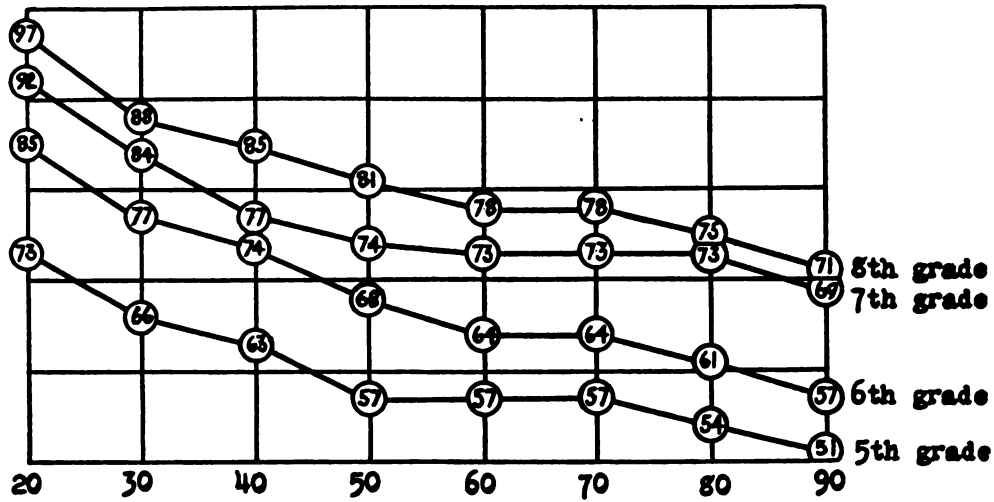


Diagram 14.—Average speed of handwriting at each quality of writing from 20 to 90. 10,528 cases from 5th, 6th, 7th, and 8th grades. Figures inclosed in circles indicate letters written per minute. Figures on base-line of diagram indicate qualities

TABLE 8.—AVERAGE SPEED AND AVERAGE QUALITY OF HANDWRITING AMONG 10,528 PUPILS IN THE FOUR UPPER GRADES OF 36 ELEMENTARY SCHOOLS

School	Speed in letters per minute				Quality by Ayres scale			
	5th	6th	7th	8th	5th	6th	7th	8th
Addison	61	78	83	79	50	54	52	55
Brownell	39	78	62	88	44	49	57	45
Case	75	89	84	91	40	43	44	53
Case Woodland	57	71	75	80	48	51	52	47
Chesterfield	51	77	91	82	39	30	30	39
Columbia	76	77	82	82	41	49	48	56
Dawning	58	61	64	80	43	47	51	50
Denison	71	60	86	85	62	60	59	59
Dike	54	55	61	64	46	53	53	65
Doan	58	81	75	91	45	49	52	47
Dunham	72	71	85	88	44	46	44	58
Eagle	56	72	76	94	44	56	61	54
Fairmount	53	60	72	68	43	44	48	49
Fruitland	69	81	45	58	54	56	67	67
Fullerton	64	71	77	92	44	61	50	61
Giddings	58	71	76	70	35	38	44	52
Gilbert	69	50	57	64	40	50	49	53
Hodge	64	83	81	91	43	43	46	49
Kennard	59	65	73	71	38	38	49	64
Kentucky	65	66	73	76	36	39	46	49
Landon	57	62	89	90	46	51	50	56
Longwood	48	52	97	81	60	58	41	53
Marion	63	62	71	95	57	49	47	51
Memorial	44	60	68	74	46	48	49	52
Memphis	57	93	73	99	44	45	44	57
Mt. Pleasant	43	47	50	46	46	53	58	62
North Doan	71	79	86	94	41	43	50	56
Nottingham	83	87	85	87	32	48	42	49
Orchard	58	50	96	54	48	54	55	69
Quincy	52	55	89	91	57	61	60	61
Rosedale	56	70	77	70	42	47	46	48
South	79	83	77	101	36	35	46	45
Stanard	71	90	90	79	44	41	44	55
Wade Park	49	75	78	72	55	46	61	69
Waring	42	84	58	66	51	46	56	55
Willson	56	68	70	74	47	54	52	56
Average	60	70	76	80	45	48	50	55

she requires a child to do a piece of writing again, because the quality is not satisfactory, she applies her standard. Usually the teacher's standards of rate are less definite than her standards of quality, because the school has commonly been willing to let children take their time, if only the quality is acceptable. The business man, on the other hand, insists that the clerks he employs shall write with speed as well as legibility and often he is heard to complain because the school does not cultivate rapid writers.

The various standards which are thus applied in school and out of school are based in every case on more or less experience. Neither the teacher nor the business man expects more than ordinary human nature can produce, but they do not feel satisfied that the individual writer with whom they are dealing should fall below the level which their experience convinces them he ought to attain. Though experience is the basis of these personal standards, such experience is likely to be limited or vague, hence the demand for a more exhaustive study of the achievements of a large body of writers in order to give a firmer basis for the definition of standards.

Some teachers have a wrong notion about standards. They think of standards as absolute and as given once for all. For example, some teachers believe that the standard in penmanship is the copper plate model given at the top of the page of the copybook. They become so enamored of this perfect model that they concentrate their whole attention on quality and forget speed as a desirable end to be

attained in teaching children to write. What such teachers need is a new conception of educational standards. True standards of penmanship always involve a balance between speed and legibility. Furthermore, the ability of children of different ages must be taken into account in striking the balance.

This conception of a standard does not limit a teacher who wishes to carry her pupils to a higher level than that which is usually reached. If she can justify her practice, she is quite at liberty to emphasize penmanship and cultivate the highest type of perfection. She should, however, be perfectly clear about what she is doing. She should keep the balance between speed and quality in mind, and, furthermore, she should remember that there is a balance to be maintained in school work between penmanship and reading, between penmanship and arithmetic—in short, between all the studies in the curriculum.

Emphasis in Various Schools

This discussion of the value of empirical standards prepares us to understand the final study which was made of the penmanship records. The relative emphasis on speed and quality actually found in a number of different schools is set forth in Diagram 15. The separate parts of this diagram are made up as follows: The average speed of a grade is represented by distances in the horizontal, and average quality by distances in the vertical, scale. Thus, taking the first section of the diagram, that of the North Doan

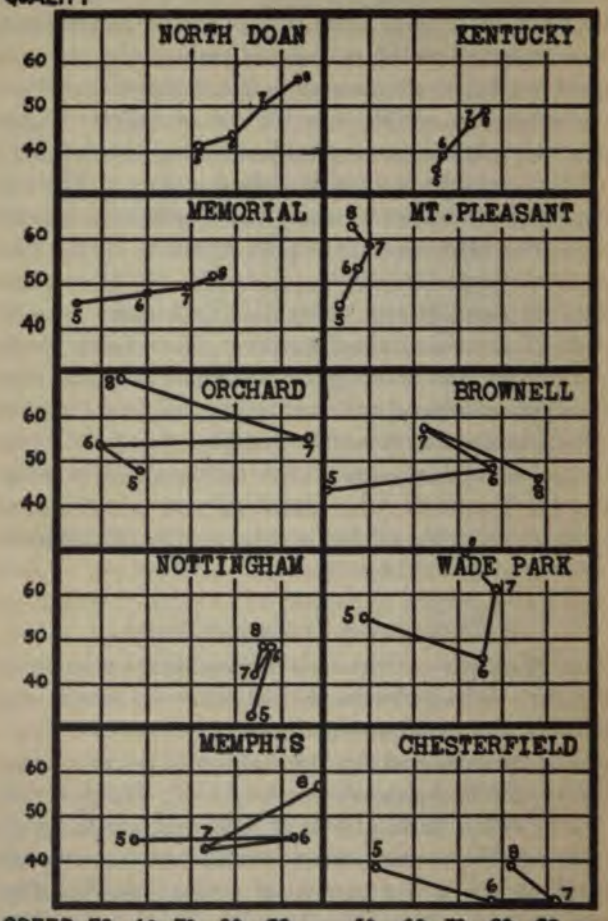


Diagram 15.—Average quality and average speed of handwriting of pupils of four upper grades in 10 schools. Quality on vertical scale, speed on horizontal scale

School, the fifth grade has an average speed of 71 letters per minute, and an average quality of 41. The sixth grade shows progress in both speed and quality, though speed increases more than quality. The seventh and eighth grades show further progress in both speed and quality, the two changing at about the same rate. The diagram for the Kentucky School shows progress of a slightly different type. In this school the sixth grade, as compared with the fifth, shows progress in quality, but very little in speed. Progress from the sixth grade on is about equal in quality and speed. Memorial School emphasizes speed almost exclusively up to the eighth grade, while Mt. Pleasant emphasizes quality.

The various schools which have been reported in the four upper sections of the diagram are all regular in the sense that each school shows steady progress from grade to grade in both speed and quality. Without attempting to comment in detail on the special cases, attention is called to the series of results presented in the lower part of the diagram. These exhibit the most extraordinary fluctuations in emphasis. They tell their own story with perfect clearness. Also they illustrate the necessity of an exact study of standards.

Comparison of Cleveland with Other Cities

The question will doubtless arise in the minds of Cleveland teachers, "How do the schools here compare with those in other cities?" It is not as impor-

tant for the Cleveland schools to know what is going on outside of the city as it is to master their own problems. Furthermore, there are no measurements

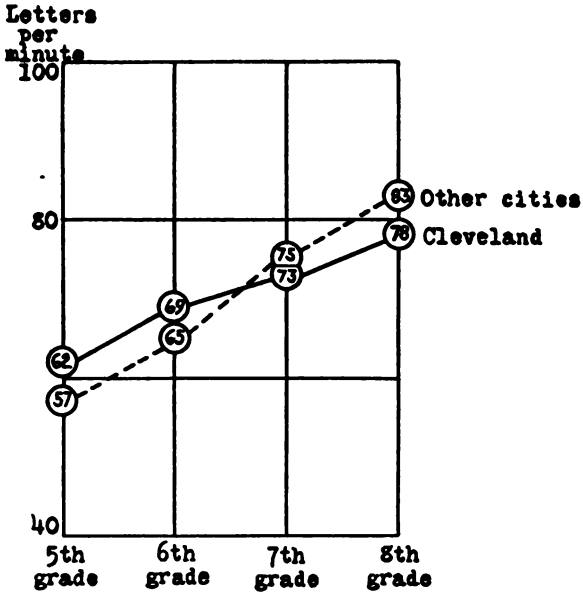


Diagram 16.—Average speed of handwriting in letters per minute among 25,387 pupils in four upper grades in Cleveland and among 10,000 pupils in the same grades in 12 other cities

at hand which can be compared exactly with those on which this report is based. There is somewhat similar material for the four upper grades from 12

other cities,* and a comparison is exhibited in Diagrams 16 and 17. From these it will be seen that in both speed and quality the Cleveland schools are

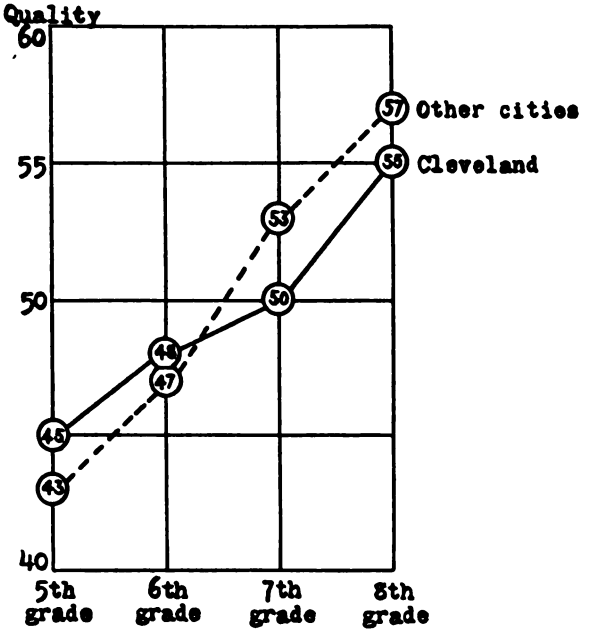


Diagram 17.—Average quality of handwriting among 10,528 pupils in four upper grades in Cleveland and among 10,000 pupils in the same grades in 12 other cities

superior in the fifth and sixth grades and inferior in the seventh and eighth.

* Starch, "The Measurement of Efficiency in Reading, Writing, Spelling, and English." University of Wisconsin, 1914.

Recommendations

The example of those schools which exhibit steady progress in both speed and quality is undoubtedly the safe example to follow. It is undesirable to cultivate one or the other of these characteristics in the extreme.

The individual teacher should study the place of her grade in the whole series and should aim to secure as high a quality as is consistent with reasonable speed. The details are exhibited in Diagram 14, which should become the guide of each teacher.

Supervision should bring into line such irregular schools as those reported in the lower sections of Diagram 15. The best form of supervision is that which can be secured through repetition of the tests. Any school which finds its sixth grade far ahead in speed but far behind in quality has its problem for that grade more clearly defined than it can be by any purely personal judgment of a supervisor.

Summary

This chapter describes the methods employed and some of the complications met with in writing tests. The following results are then reported in detail:

1. Speed varies from an average for the lowest fifth grade of 39 letters per minute to an average of 101 letters per minute for the highest eighth grade. Between these limits are the widest fluctuations of grades.
2. Like variations in quality appear.
3. In general, speed and quality vary inversely.

There is a middle series of speeds and qualities where improvement in one does not seem to interfere with the other. This area probably defines the limits of profitable effort to improve pupils.

4. The progress of successive grades in various schools shows that some schools achieve a definite progression in both speed and quality, while other schools are without consistent policies of development.

Finally, the chapter closes with recommendations on instruction in writing and on supervision.

CHAPTER V

TESTS OF SPELLING

Tests of spelling are definite in their results because the words can be given and can be scored with few of the complications which are involved in tests in the other subjects. Furthermore, it is easy to compare Cleveland with other cities because a recent study has made available a very large body of results from 84 cities. Two complete spelling tests were accordingly made in all the regular elementary schools in all grades from the second to the eighth.

Words for the Tests

The words for these tests were selected from the 1,000 words most commonly used in written and printed matter, such as letters, newspapers, and books. These 1,000 words have been divided through elaborate studies into groups of approximately equal difficulty. Accepting the results of the earlier studies, two sets of 20 words were made up for each grade. The words of these sets were so chosen that the 40 words given to each grade were of uniform difficulty. The various lists for the successive grades were of different

degrees of difficulty, the hardest words being given to the upper grades. Two distinct tests were given in order to cover two types of spelling which call for somewhat different kinds of ability. The first test was given in such a way that half of the schools were required to spell the words as isolated words, while the rest were required to spell the same words in sentences. In the second test each grade had a new list, and the distribution of sentences and isolated words was reversed. Those children who had before spelled isolated words now had sentences, and those who had spelled in sentences in the first test now had isolated words.

Number of Returns

In the first test 1,068,080 spellings were secured from 53,404 pupils; in the second, 1,033,360 spellings from 51,668 pupils.

Variation in Schools and Grades

As in the case of handwriting, it appears from the spelling tests that there is great difference in attainment in the various schools. Diagram 18 shows the average percentage of correctly spelled words in all the schools. The square at the extreme left of the diagram indicates that School No. 41 averaged in all grades 63 per cent correctly spelled words, while the square at the right indicates that School No. 19 averaged 86 per cent.

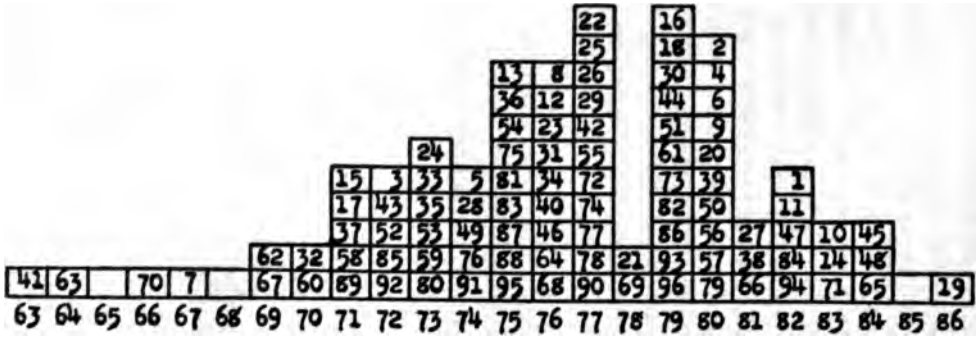


Diagram 18.—Average scores made in spelling by the 96 elementary schools. The figures below the diagram show the percentages and the ones in the diagram show the numbers of the schools as given in Table 9

The results of the tests in spelling words as parts of sentences and as isolated words are not reported in full because no significant difference was found for Cleveland children. It does not follow from this fact that there is no difference between the two types of spelling, but the material from Cleveland does not justify any emphasis on the distinction. The precaution of introducing the two types of spelling was taken before any of the results were tabulated, so that there was at the time that the test was tried no definite information at hand to determine whether or not the distinction would be of importance. The full results for 96 schools are shown in Table 9.

TABLE 9.—AVERAGE SCORE MADE IN SPELLING BY EACH GRADE IN EACH OF THE 96 REGULAR ELEMENTARY SCHOOLS

	Grade							Average
	2nd	3rd	4th	5th	6th	7th	8th	
1. Addison	90	84	78	73	88	84	76	82
2. Alabama	72	85	79	84	82	..	..	80
3. Barkwill	69	71	59	74	81	71	79	72
4. Bolton	82	82	74	84	79	79	79	80
5. Boulevard	61	74	68	77	82	83	72	74
6. Broadway	85	81	80	78	83	79	75	80
7. Brownell	61	75	64	60	74	65	69	67
8. Buhrer	72	83	74	74	81	74	76	76
9. Case	76	87	73	80	86	82	78	80
10. Case Woodland	70	88	80	87	90	82	83	83
11. Central	78	85	79	86	82	82	81	82
12. Chesterfield	93	77	72	66	81	66	78	76
13. Clark	77	79	64	74	78	75	79	75
14. Columbia	85	87	87	79	82	79	80	83
15. Dawning	67	68	70	75	75	72	71	71
16. Denison	76	80	75	83	77	81	79	79
17. Detroit	60	71	76	71	77	71	72	71
18. Dike	64	84	83	85	79	73	86	79
19. Doan	98	92	86	88	79	81	78	86
20. Dunham	88	84	83	80	76	71	76	80

TABLE 9.—(*Continued.*)

	Grade							Average
	2nd	3rd	4th	5th	6th	7th	8th	
21. Eagle	64	76	74	84	82	76	92	78
22. East Boulevard	78	85	71	71	79	78	..	77
23. East Clark	66	83	75	81	78	75	72	76
24. East Denison	69	80	71	71	77	70	75	73
25. East Madison	84	86	75	74	75	69	75	77
26. Euclid Park	68	72	79	83	84	..	..	77
27. Fairmount	80	83	81	78	80	83	81	81
28. Fowler	70	74	69	71	79	74	81	74
29. Fruitland	62	78	79	85	77	70	90	77
30. Fullerton	70	86	68	71	78	80	98	79
31. Giddings	75	75	78	74	79	69	80	76
32. Gilbert	69	71	62	71	70	71	72	70
33. Gordon	63	77	63	65	77	77	88	73
34. Halle	67	76	69	76	79	81	82	76
35. Harmon	62	73	78	70	66	80	79	73
36. Harvard	78	79	71	72	74	74	76	75
37. Hazeldell	68	77	61	74	75	67	76	71
38. Hicks	69	85	77	77	84	81	91	81
39. Hodge	85	81	79	78	79	81	79	80
40. Hough	87	79	80	72	75	69	69	76
41. Huck	76	57	55	39	65	64	86	63
42. Kennard	70	82	74	77	87	75	76	77
43. Kentucky	70	62	75	81	71	76	69	72
44. Kinsman	69	76	75	79	84	87	86	79
45. Landon	78	83	84	86	83	86	85	84
46. Lawn	64	79	77	77	81	79	78	76
47. Lincoln	79	81	80	82	86	80	88	82
48. Longwood	87	90	82	86	86	82	76	84
49. Marion	63	78	68	79	77	67	89	74
50. Mayflower	74	84	81	80	81	82	80	80
51. Memorial	77	87	72	73	82	80	80	79
52. Memphis	73	83	66	59	80	62	79	72
53. Miles	78	71	74	74	78	69	70	73
54. Miles Park	77	71	76	74	77	72	80	75
55. Milford	68	77	76	76	75	79	87	77
56. Mill	79	83	82	71	85	77	80	80
57. Mt. Pleasant	74	87	72	83	84	83	78	80
58. Moulton	63	78	62	74	76	72	71	71
59. Mound	85	64	82	67	72	69	74	73
60. Murray Hill	65	73	64	64	68	78	79	70
61. North Doan	86	77	73	78	77	80	82	79
62. Nottingham	78	67	71	69	64	64	68	69
63. Observation	62	76	52	58	63	75	..	64
64. Orchard	79	71	66	72	78	83	83	76
65. Outhwaite	83	88	84	86	86	80	83	84

TABLE 9.—(*Continued.*)

	Grade							Average
	2nd	3rd	4th	5th	6th	7th	8th	
66. Parkwood	77	85	79	83	76	79	88	81
67. Pearl	71	67	66	74	68	..	..	69
68. Quincy	86	72	72	68	76	74	82	76
69. Rice	76	79	71	72	81	83	84	78
70. Rockwell	44	72	64	72	82	..	..	66
71. Rosedale	85	88	80	78	82	83	85	83
72. Sackett	74	79	74	70	76	84	80	77
73. Scranton	66	73	71	75	79	89	98	79
74. Sibley	76	74	75	79	76	80	78	77
75. South Case	69	78	76	71	77	78	78	75
76. South	79	70	75	73	76	77	68	74
77. Sowinski	74	85	75	81	77	69	77	77
78. Stanard	74	70	81	84	80	75	76	77
79. St. Clair	81	84	69	74	79	78	96	80
80. Sterling	73	81	74	69	70	72	71	73
81. Tod	75	81	69	65	85	74	75	75
82. Tremont	81	78	73	73	89	75	82	79
83. Union	72	76	71	74	80	75	77	75
84. Wade Park	85	87	82	82	80	78	78	82
85. Walton	65	76	69	72	74	71	77	72
86. Waring	70	83	69	76	94	83	81	79
87. Warner	61	76	80	79	79	80	76	75
88. Warren	68	69	68	72	78	76	92	75
89. Washington Park	68	73	68	60	71	75	85	71
90. Watterson	73	72	68	77	82	79	87	77
91. Waverly	80	75	58	68	80	77	77	74
92. Willard	72	80	65	66	67	75	81	72
93. Willson	80	86	76	75	83	75	77	79
94. Woodland	81	84	80	72	83	84	90	82
95. Woodland Hills	68	81	73	74	75	75	77	75
96. Wooldridge	73	84	77	81	83	81	73	79
Average	74	78	73	75	78	76	80	76
Average for 84 American cities	77	77	76	76	76	76	76	76

The averages for the fourth and eighth grades are taken from the table and represented graphically in Diagram 19. It will be seen at once that the differences between grades of like denomination which

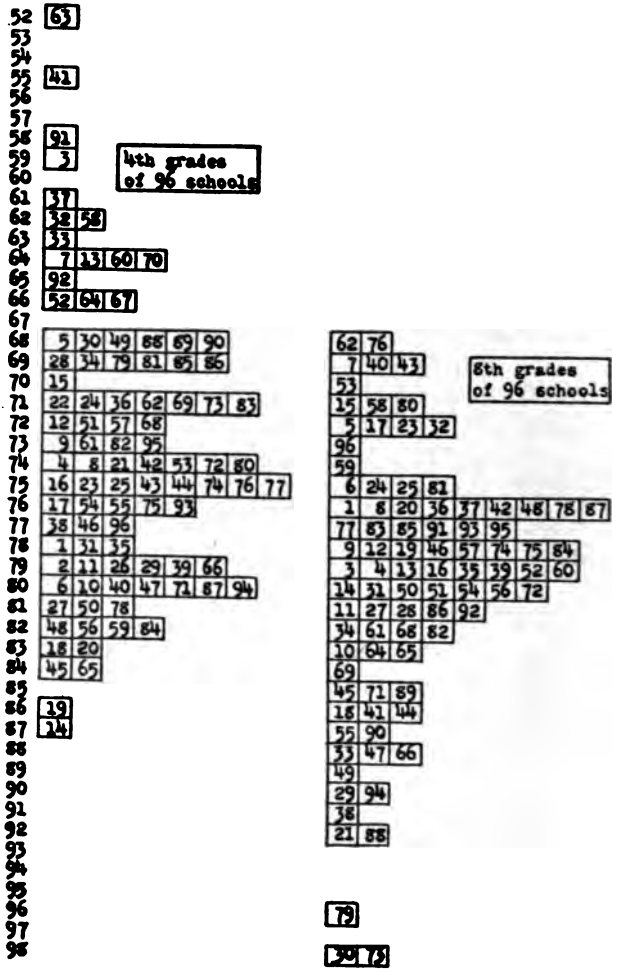


Diagram 19.—Average scores in spelling of the fourth grades and eighth grades in 96 elementary schools. Figures on the left represent percentages, while figures in the squares represent the schools as numbered in Table 9

were shown in the case of penmanship are here paralleled in spelling. These differences are impressive when it is borne in mind, as pointed out in the last chapter, that these are not differences between individual pupils, but between whole grades. There is one fourth grade which spelled corrected only 52 per cent of the 40 words, while another grade correctly spelled 87 per cent.

Variations in Rates of Progress in Different Schools

There is another way in which the results for different schools may be presented; that is, by contrasting the progress through the grades in a given school with the average progress from grade to grade throughout the city. Diagram 20 gives the records of six schools selected to show different types of progress. In each of the diagrams in this figure the full drawn oblique line represents the average percentage in the successive grades for the whole city. The broken lines show the records of certain schools. Thus, in the upper part of the diagram, Doan School is shown as conspicuously above the city's average in the second to the fifth grades and slightly above in the sixth and seventh grades. Some of the other schools are shown to be above the average in certain grades and below in others.

Cleveland Has an Average Record

A comparison with other cities shows that Cleveland is exactly at the average. When the large foreign

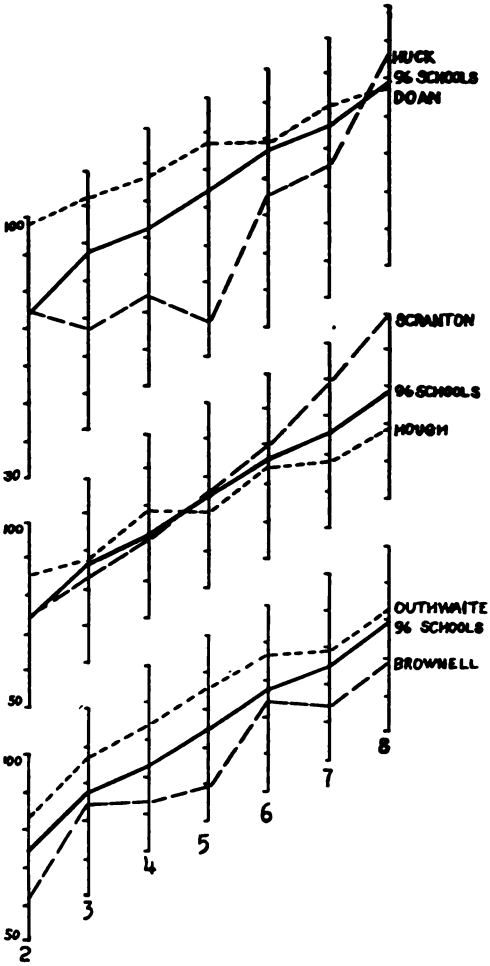


Diagram 20.—Average scores in spelling in each grade from the second through the eighth in all schools and in six selected schools

population is considered this is a good showing. When, on the other hand, the possibilities of improve-

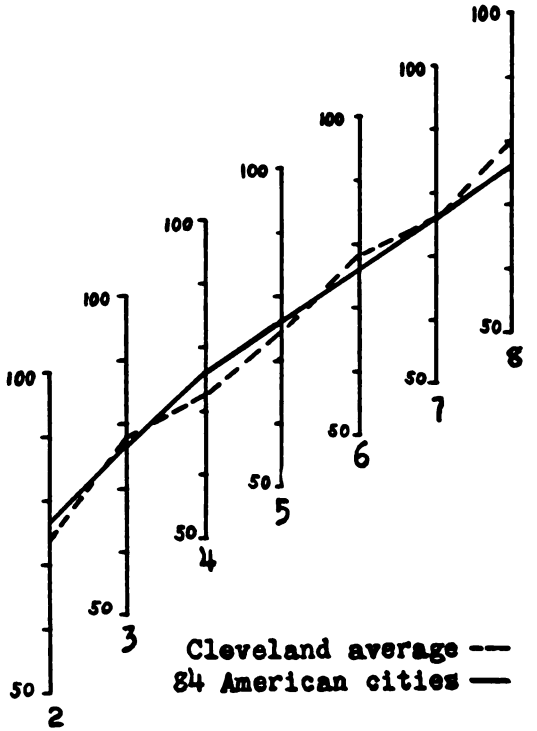


Diagram 21.—Average scores in spelling in each grade from the second through the eighth in Cleveland and in 84 American cities

ment are considered as clearly set forth in the comparative tables, it becomes evident that Cleveland

ought to aim at a position above the average. The schools which are low ought to be raised to the standard of those which are above the average.

Recommendations

Supervision should aim here, as in handwriting, to secure greater uniformity throughout the city. If schools continue under supervision to show wide differences, a study should be made of the methods employed in the more successful schools. Indeed, it is advantageous in general that teachers whose classes are behind the average visit classes where the spelling is good. Very frequently it will be found that the most significant training is given, not in the special spelling class, but in the general study of word-forms.

The words used in the spelling exercises should be selected with a view to training pupils in the mastery of common words which they will use frequently. To this end the vocabulary of ordinary school life should be closely watched and recorded.

Summary

This chapter describes the method of conducting tests in spelling and presents the following results:

1. Schools differ widely in the average ability of pupils to spell.

2. Grades of like denomination differ widely in spelling.

3. The progress of children in successive grades of different schools presents striking contrasts and marked deviations from the average for the whole system.

4. Cleveland is an average city in spelling.

The chapter closes with recommendations.

CHAPTER VI

STUDIES OF ARITHMETIC

The tests in arithmetic were made before the new course of study went into operation. It will be remembered from the first chapter of this report that the number of failures in arithmetic was very large. The effectiveness of the change in the course will be indicated in part by the number of children who fail from this time on. This report has, however, the very great advantage of being a definite record of conditions at the time when the course was changed. From the third grade to the eighth there is here a very comprehensive record of the knowledge which the pupils now possess in the fundamentals of arithmetic. It will be quite possible a few months hence to determine with precision the success of the change so far as fundamental operations are concerned.

The test and the results can in the mean time be used to good advantage in exhibiting the complexity of arithmetic operations. Teachers and parents alike can be brought to see what is the task of the instructor in developing this subject in the grades.

Incidentally, the test shows how urgently a change in the course was required, for it shows, as do the

studies of writing and spelling, the great differences between grades, and the lack of uniform progress as the children pass through the grades of a given school. The fact that the test which was devised to analyze the arithmetical processes is new, renders it impossible to show with exactness how Cleveland ranks with other cities, but the general indications are that Cleveland does very well in arithmetical fundamentals.

Spiral Character of the Test

The test which was given to all the A grades in the system included a number of different forms of each of the fundamental operations. Thus, in addition the first and simplest exercise of the test consisted in adding pairs of figures. Later in the series, addition appeared again, but in a more elaborate form. It was here required that a short column of figures be added. The third case of addition consisted in the adding of fractions of like denominators. The fourth case consisted in the addition of a longer column of figures. This differs from short-column addition in the fact that a greater effort of attention is required in order to complete the addition. Addition of four-place figures, which requires carrying forward from one column to the next, and addition of fractions of unlike denominators, constituted the final and most elaborate stages of the addition process. The purpose of introducing these various types of addition was to test the ability of the different grades to per-

form increasingly elaborate operations. Similar spiral tests in subtraction, multiplication, and division were interwoven with the exercises in addition.

Test of Speed

In the second place, the test was so presented that the rate of the work in the different grades could be determined. For example, taking the simplest of the processes of addition, the opportunity was provided on the test sheet for the pupil to perform a large number of operations. The time during which he was allowed to work on this part of the test was limited to 30 seconds. The result was that no child exhausted the possibilities that were offered on the test sheet. In the lower grades the number of additions performed was relatively small. In the upper grades the number was very much larger, and yet even in this latter case each child had an opportunity to show his maximum possibility in 30 seconds. The test shows, therefore, both the complexity of the processes which a given grade can master and also the number of examples of a given type that can be performed in the specified time.

A detailed description of the test can be coupled with a presentation of the results for the city as a whole. We turn, therefore, directly to the general results. These are presented in Table 10 and Diagram 22. Each horizontal line in the diagram is proportionate in length to the median number of examples solved in a given grade.

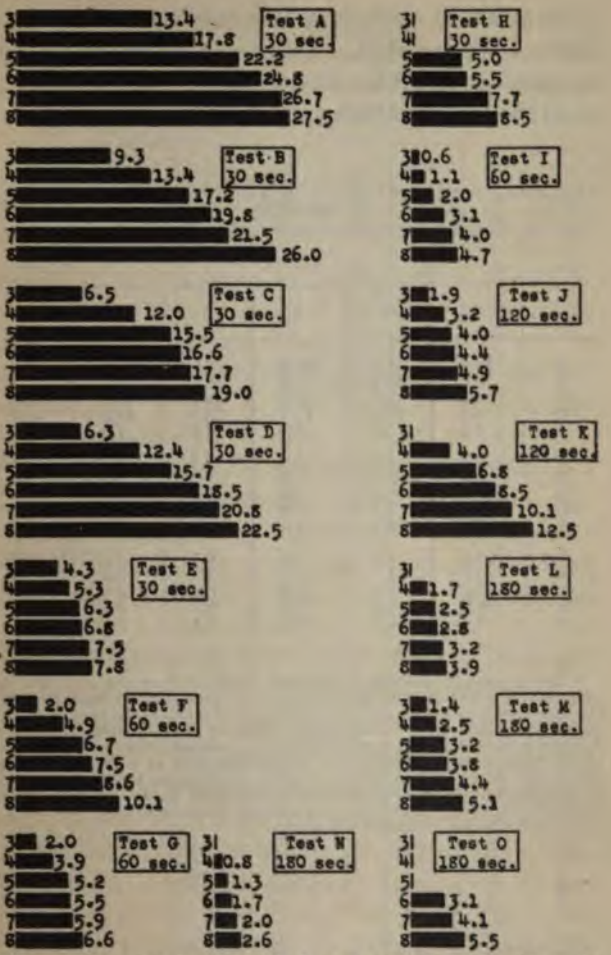


Diagram 22.—Median records for all schools in 15 arithmetic tests. Figures at the left end of each line indicate grades; figures at the right end show the median score of the grade

In order to show how the results were handled, Table 11 is inserted. This table shows in full the medians in Test A for all the grades above the second in all the schools which gave the tests in these grades.

TABLE 10.—MEDIANS * IN EACH ARITHMETIC TEST FOR ALL GRADES

Test	Grade					
	3	4	5	6	7	8
A	13.4	17.8	22.2	24.8	26.7	27.5
B	9.3	13.4	17.2	19.8	21.5	26.0
C	6.5	12.0	15.5	16.6	17.7	19.0
D	6.3	12.4	15.7	18.5	20.8	22.5
E	4.3	5.3	6.3	6.8	7.5	7.8
F	2.0	4.9	6.7	7.5	8.6	10.1
G	2.0	3.9	5.2	5.5	5.9	6.6
H	0.0	0.0	5.0	5.5	7.7	8.5
I	0.6	1.1	2.0	3.1	4.0	4.7
J	1.9	3.2	4.0	4.4	4.9	5.7
K	0.0	4.0	6.8	8.5	10.1	12.5
L	0.0	1.7	2.5	2.8	3.2	3.9
M	1.4	2.5	3.2	3.8	4.4	5.1
N	0.0	0.8	1.3	1.7	2.0	2.6
O	0.0	0.0	0.0	3.1	4.1	5.5

* The median is a quantity slightly different from the average. In order to determine the median, all the cases are arranged in order from the best down to the poorest, and the middle case is taken as the typical case to represent the full series. Thus, in the following series of figures, 1, 2, 3, 4, 5, three is the median or typical case. The median differs from the average in that each figure influences the median only as a single case. In calculating the average extremely large or small figures influence the result in undue degree. Thus the average in the series 12, 4, 3, 2, 1, is unduly influenced by the number 12. The average is 4.4; while the median is 3 and is more nearly typical of the group.

TABLE 11.—MEDIAN SCORES IN TEST "A" IN SIX GRADES OF 90 SCHOOLS

	Grade					
	3	4	5	6	7	8
Addison	11	18	22	24	19	28
Alabama	13	25	23	23	..	..
Barkwill	12	18	26	29	27	27
Bolton	25	17	23	24	26	29
Boulevard	9	13	21	18	24	27
Broadway	14	20	20	27	26	40
Brownell	14	21	27	33	27	26
Buhrer	13	16	23	25	27	30
Case	21	18	22	32	28	30
Case Woodland	26	22	40	25	32	27
Central	..	25	23	24	25	33
Chesterfield	12	16	18	19	19	26
Clark	12	35	23	28	28	31
Columbia	17	23	21	21	26	27
Dawning	12	16	21	22	23	28
Denison	14	18	19	22	26	28
Detroit	13	30	22	26	26	28
Dike	..	21	21	22	30	32
Dunham	17	17	38	23	23	28
Eagle	14	21	28	31	45	35
East Boulevard	12	15	20	25	25	..
East Clark	12	18	23	26	25	33
East Denison	17	22	26	24	23	34
East Madison	15	..	20	28	27	25
Fairmount	12	14	21	22	22	27
Fowler	14	14	16	21	28	..
Fruitland	12	..	27	..	22	27
Fullerton	12	14	21	26	24	..
Giddings	..	15	23	26	26	36
Gilbert	20	14	24	23	23	28
Gordon	12	14	26	22	26	31
Halle	12	22	16	19	31	37
Harmon	14	21	22	32	29	30
Harvard	11	..	20	27	31	22
Haseldell	13	17	23	27	36	31
Hicks	14	18	21	18	27	24
Hodge	15	26	27	26	30	32
Hough	14	15	20	21	29	32
Huck	13	16	34	26	21	26
Kennard	19	24	27	27	30	38
Kinsman	11	15	23	26	27	28
Landon	10	16	21	24	27	29
Lawn	15	19	23	22	26	26
Lincoln	18	18	23	29	26	32
Longwood	..	30	26	26	..	39

TABLE 11.—(*Continued.*)

	Grade					
	3	4	5	6	7	8
Marion	22	17	30	28	31	27
Mayflower	12	28	23	26	37	27
Memorial	38	14	18	22	27	26
Memphis	19	14	21	26	24	31
Miles	12	18	17	18	24	23
Miles Park	15	21	20	19	24	23
Milford	14	21	24	24	26	32
Mill	11	15	21	29	27	34
Mt. Pleasant	14	..	20	25	26	23
Mound	27	..	22	22	35	40
Murray Hill	27	17	26	32	23	27
North Doan	13	19	22	25	22	31
Nottingham	13	40	20	..	..	22
Orchard	57	17	23	24	30	27
Outhwaite	14	18	27	26	27	41
Parkwood	13	17	18	23	30	28
Pearl	13	15	23	24	..	..
Quincy	13	21	21	21	27	33
Rice	13	25	22	47	26	26
Rosedale	16	20	19	23	27	26
Sackett	..	21	19	26	30	25
Scranton	9	20	22	25	40	33
Sibley	22	17	19	21	26	24
South Case	13	14	21	36	32	26
South	12	14	21	22	26	26
Sowinski	13	15	28	26	27	27
Stanard	12	22	20	27	30	27
St. Clair	9	14	26	27	26	26
Sterling	13	21	21	22	27	27
Tod	9	14	18	21	23	28
Tremont	18	33	22	28	29	37
Union	14	40	21	23	26	26
Wade Park	31	18	22	22	25	27
Walton	13	31	19	23	22	27
Waring	13	22	28	30	38	32
Warner	10	18	18	21	40	27
Warren	15	15	24	31	27	28
Washington Park	14	16	14	25	27	26
Watterson	29	16	25	21	25	23
Waverly	13	14	21	21	26	27
Willard	21	18	17	24	22	21
Willson	16	17	22	29	27	26
Woodland	12	21	22	24	24	31
Woodland Hills	26	16	23	22	27	32
Wooldridge	30	26	40	27	32	34

Test A

Test A was the simplest test and dealt with the addition of simple one-place numbers. These numbers were printed one above the other in pairs and the pupil was required to write the results as fast as possible for a period of 30 seconds. As shown in the diagram, the median for all third grade pupils is 13.4 examples. The median for the fourth grade is 17.8 examples, the median for the fifth grade 22.2, and so on.

The results show that ability to add simple figures had reached a relatively high stage in the third grade at the time that the grade was tested. From this point on the improvement exhibited from grade to grade grows relatively less as we approach the end of the elementary course.

Test B

Test B required the pupils to subtract one-place numbers from one-place and two-place numbers. It is interesting to note to what extent subtraction is, in general, a more difficult process than addition as shown by the lower median scores in subtraction. Furthermore, it should be noted that in the upper grades, while addition shows little improvement because it has reached its maximum, the record in subtraction begins to overtake the record in addition. The development of ability in subtraction shows a striking peculiarity in that improvement in the eighth grade over the seventh grade is very marked

indeed. This may be due in part to the non-promotion of pupils who have all along had difficulty with their subtraction. It will be remembered that arithmetic played a large part in the non-promotions throughout the schools. Each of the improvements recorded in the diagram in all the series is to be explained, therefore, in part by the fact that children who do not succeed in the fundamental operations drop out. But the striking superiority of the eighth grade in subtraction is not paralleled by any corresponding improvement in addition or by an equally sharp rise in the subtraction curve anywhere below the seventh grade. We must infer that the greater intellectual maturity of the pupils in the eighth grade helps them to overcome in special degree some of the difficulties which all along have kept the subtraction record behind that of addition.

Test C

Test C deals with multiplication. One-place numbers are multiplied by one-place numbers. The resemblance between the general rates of improvement in multiplication and addition will be obvious from an inspection of the diagrams. At the same time, it will be noted from the lower median scores that the process of multiplication is more difficult than the process of addition or the process of subtraction.

Test D

Test D deals with simple division of one-place and two-place numbers by one-place numbers. Division evidently is more difficult throughout the schools than addition and subtraction. At first it is on practically the same level but shows a different type of progress through the grades.

There is one purely accidental factor which may explain the difference between division and multiplication. The writing of results in the multiplication problems frequently involves the writing down of two figures, whereas in the division process there is only one figure to be written. Further tests, including some which would record the results in oral form, would be helpful in determining whether the apparent difference between division and multiplication is due merely to the time required for writing the results.

In any case the progress in division is seen to be of a type different from progress in multiplication.

Test E

Test E deals with the addition of short single columns of figures. There were in the columns of this section of the test five figures to be added. Zero was included with the other digits, so that in some cases the eye could pass directly over zero and the number of operations was thus materially reduced. Furthermore, there are a good many short cuts which children who become skillful in adding columns of

figures employ. Thus, if a child has been trained to recognize eight and two and other like combinations as equal to 10, the actual process of addition will be facilitated by the more frequent appearance of such combinations in columns than in single pairs such as were presented in Test A.

Furthermore, the time in writing down results is much shorter than it would be for an equal number of additions of pairs of one-place figures. All these considerations must be kept in mind in making a comparison between the results for Test E and Test A. The form of the improvement curve in the case of these two tests is not unlike, with the notable exception that the third grade seems to be relatively more efficient in adding columns than it is in adding single figures. Since there are five numbers in each column to be added, we may multiply each of the records in Test E by four and compare the results with those for Test A. All the grades will then show a slightly higher record in Test E than in Test A.

Test F

Test F consists of a more elaborate process of subtraction. Here three-place numbers are to be subtracted from three-place or four-place numbers set down above them. In some cases there is borrowing and the process of subtraction is therefore much complicated. The results given for this test in the diagram are not directly comparable with the results of the simpler tests discussed up to this point because

the time allowed for this test was 60 seconds, twice the time allowed for Tests A to E. A comparison with Test B can be made, therefore, only after dividing the results of Test E by two to make allowance for time, and multiplying by three because each example involves three subtractions. This reduction does not, however, make allowance for the process of borrowing which was mentioned as a complicating factor in this test.

We are interested, however, much more in the form of the diagram than in any effort at exact quantitative comparison. We note here again the fact that the eighth grade shows a sharp increase over the seventh grade in its ability to perform subtraction operations. A coincidence such as we find in comparing the diagram for Test B with the diagram for Test F, and the marked difference in form between these diagrams and all the others examined up to this point, give us confidence that an analysis based on results of a city-wide test will bring out essential facts with regard to the nature of arithmetical operations. It does not seem possible that a characteristic difference which recurs in two tests dealing with the same kind of operation can be a mere accident. Furthermore, what appears here as a striking feature of the subtraction results appears in slightly modified degree in a number of the results derived from more complex processes. Evidently the eighth grade is different from the seventh wherever complex processes are involved. On the other hand, in the simple mechanical processes of addition and multiplication

there is no such marked superiority of the eighth grade over the seventh.

Test G

Test G requires the multiplication of four-place numbers by one-place numbers. The conspicuous fact here is the slight progress recorded in the sixth and seventh grades. The process which is here involved is not merely a series of multiplications: there is some carrying forward which complicates the process. The single test does not make it clear how far the complicating factors account for the reduction in achievement in this process. The student of arithmetic is, however, impressed at every turn with the fruitful possibilities of analysis which are suggested by noticing the differences in the rate of progress from grade to grade that appear whenever the mental processes called out vary in complexity.

Test H

Test H deals with the addition and subtraction of simple fractions which are of like denomination. The third and fourth grades did not, for the most part, know anything about the technique of dealing with fractions and hence made no record. Where members of one of these grades did succeed in making a record it was very low. As soon as the technique was known, the process itself was found to be relatively easy, as is shown by the sudden increase of accomplishment at the fifth grade.

Test I

Test I involved the dividing of five-place numbers by one-place numbers. It is interesting, in view of the fact which came out in comparing simple division with simple multiplication, to note that the record for this more elaborate type of division never passes the record for the corresponding type of multiplication. Indeed the record for Test I is appreciably lower than the record for Test G, and the form of progress is very different. The explanation is probably to be found in part at least in the fact that division involves subtraction, which all along has been shown to be a more difficult process than addition, while multiplication of the type shown in Test G involves only addition in the carrying process. Here again we find much encouragement for the belief that analysis of the arithmetical processes would be very helpful to any one who prepares a course of study or attempts to judge of the success of instruction in the subject.

Test J

Test J was a test in the addition of long columns of figures. Each column consisted of 13 numbers, thus more than doubling the columns presented in Test E. One hundred and twenty seconds were allotted to this test, thus making allowance in a measure for the greater difficulty of the operation. Here again, however, we need not emphasize the merely quantitative facts. The form of the diagram showing the progress is of interest, revealing, as it does, marked

progress in the highest grades. The intellectual maturity which comes in the upper grades evidently redounds more to the advantage of long-column addition than it does to the advantage of short-column addition, as we see if we compare the record of Test J with the record of Test E.

Analysis of the process of addition of long columns of figures brings out the fact that such addition involves a long reach or span of attention. Most people who attempt to add a long column of figures realize that there comes a point in the column where attention seems to fail. One finds himself repeating the sum that he has reached up to that point in the effort to make a new start and include the new quantity, which seems for some reason to be unreasonably difficult to add to the sum already reached. Any one who has experienced this break in attention in a long column of figures will understand the statement that the addition of long columns involves not merely the knowledge of the process of addition, but also a wide range of attention.

Test K

Test K is a test in long division. Three-place and four-place numbers were divided by two-place numbers. One hundred and twenty seconds were allowed for this work. Hence Test I should be multiplied by two if we are to make a comparison between the results of Test I and Test K. When this quantitative correction is introduced, we are impressed with the fundamental difference between the two records.

The median third grade could not perform the operation at all. That may mean, as in the case of Test H, that the third grade does not know the method of this operation. Beyond the third grade there is uniform progress. The high record made in this kind of division makes it appear that when it is ultimately mastered it is the simplest of all the highly complex operations. A partial explanation of this latter fact is doubtless to be found in the relief which comes in long division from the breaking up of the operation into a succession of short steps. There is some multiplication, some subtraction, and some trial and error in division. Each step is a kind of separate resting place and a relief to attention. The intelligence necessary to guide and control the successive steps makes the process, on the whole, one of the complex processes in arithmetic, but the possibilities of rapid work are somewhat greater here than in the cases where unbroken uniformity in the mental process involved produces an excessive strain on attention.

Tests L, M, N, and O

Tests L to O may be commented on together. All of them deal with the more complex forms of the fundamental processes. In Test L four-place numbers are to be multiplied by two-place numbers. In Test M five four-place numbers are to be added. This requires carrying forward the results, but is otherwise comparable to the test in short-column addition. Test N requires the division of five-place numbers by

two-place numbers. Test O is a test in the application of the four fundamental operations to fractions where the fractions to be subtracted or added must first be reduced to a common denominator.

These tests are of some value in indicating the level at which grades may be expected to do work of this type. The four diagrams show very clearly that the eighth grade is superior to the seventh grade in each of these operations, emphasizing once more the fact which has been commented on in the case of a number of the earlier tests, that the eighth grade shows clearly its superiority where a higher type of intellectual ability is demanded.

Complexity of Educational Process

A spiral test such as that which has been described in the foregoing paragraphs exhibits, more clearly than any formal argument possibly could, something of the complexity of arithmetical processes. Each grade is confronted even in the fundamental operations with complexities that can be overcome only gradually. The teacher who assumes that addition is always the same process, whether it is encountered in the simple tables or in the addition of long columns of figures, has no adequate comprehension of the difficulties which children are really encountering as they go through the grades.

The analyses suggested by the arithmetic test also indicate the only intelligent method of organising the course of study in this subject. There is grave

danger that, while we have all come to realize the responsibility of the school for the general progress of the pupils, we shall fail to realize that it is the teacher's duty to provide the pupil with the conditions of progress in particular subjects. If arithmetic is complex, the child must not be left to make his own way through this complex maze. He must be guided step by step by a teacher who understands the complexities of the subject. While our analyses explain failures in arithmetic, they do not justify these failures. Rather they point out the way of avoiding them.

Variations in Different Schools

With the general results for the whole city before us and with our analysis of particular processes in mind, we turn to an examination of the individual schools of Cleveland to see whether they have organized the work in arithmetic equally well.

Diagram 23 makes a comparison of a type which has become familiar to the reader of earlier chapters. The upper part of the diagram represents the fifth grades of 90 schools. Each square gives the median score of a grade in Test A, simple addition. The lower part of the diagram reports the median scores in the eighth grades in the same schools in Test A. There is, it will be noted, a wide difference between different schools and there is some overlapping of the fifth grades and eighth grades. The overlapping is, however, less marked than that seen in handwriting.

A comparison between a limited number of schools is made in greater detail in Diagrams 24, 25, 26, and 27. These diagrams report results in the first four tests, A to D, that is, the tests in the four fundamental processes in their simplest form. In each of these

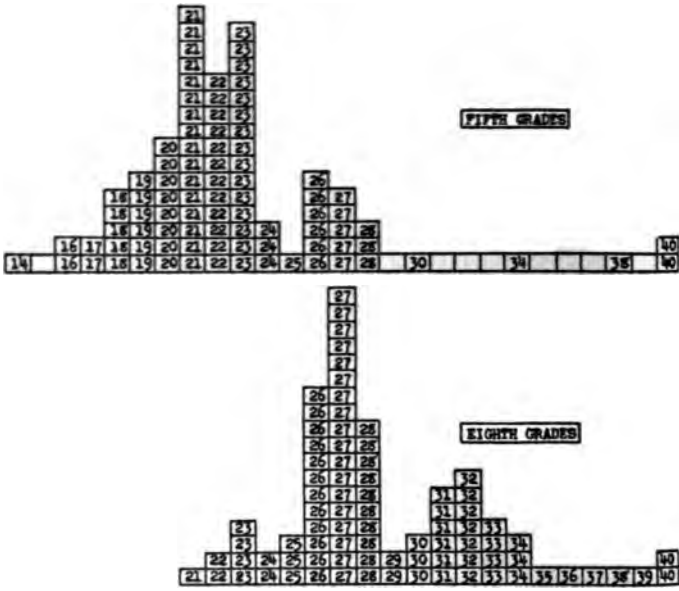


Diagram 23.—Median scores of the fifth grades and of the eighth grades in 90 schools in Test "A" in simple addition

diagrams the median scores for the whole city are repeated at the top. Two schools are then shown which were selected because in almost every grade they surpass the median for the city in that particular

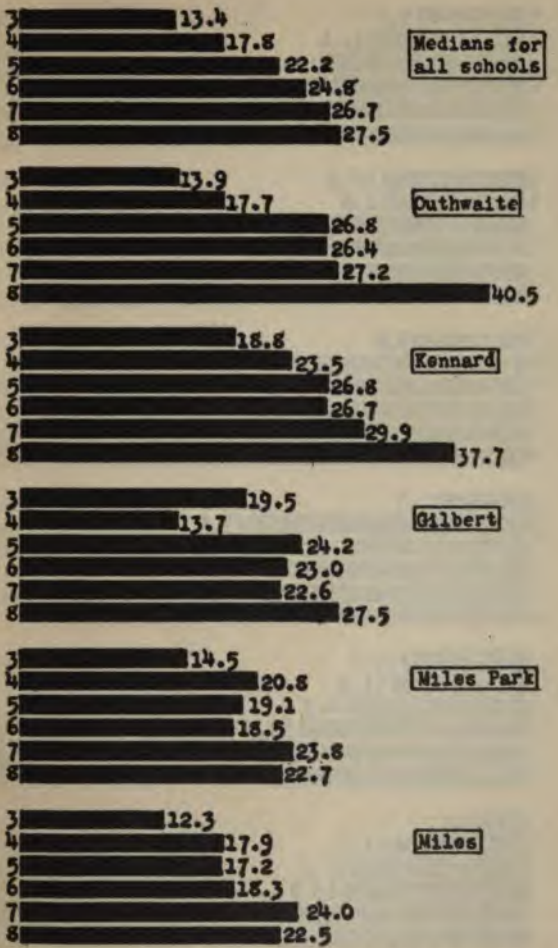


Diagram 24.—Median scores for the whole city and for five schools in Test "A" in simple addition

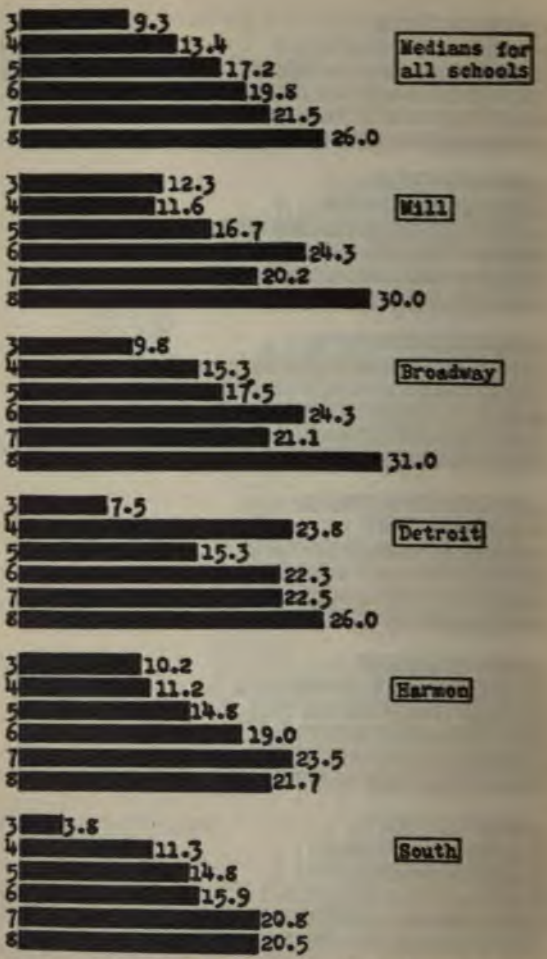


Diagram 25.—Median scores for the whole city and for five schools in Test "B" in simple subtraction

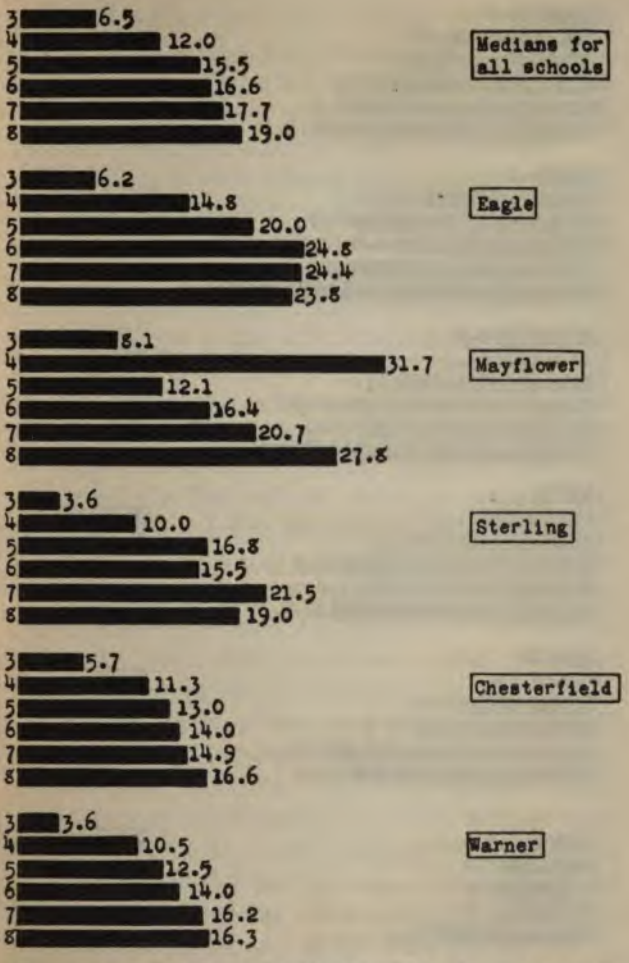


Diagram 26.—Median scores for the whole city and for five schools in Test "C" in simple multiplication

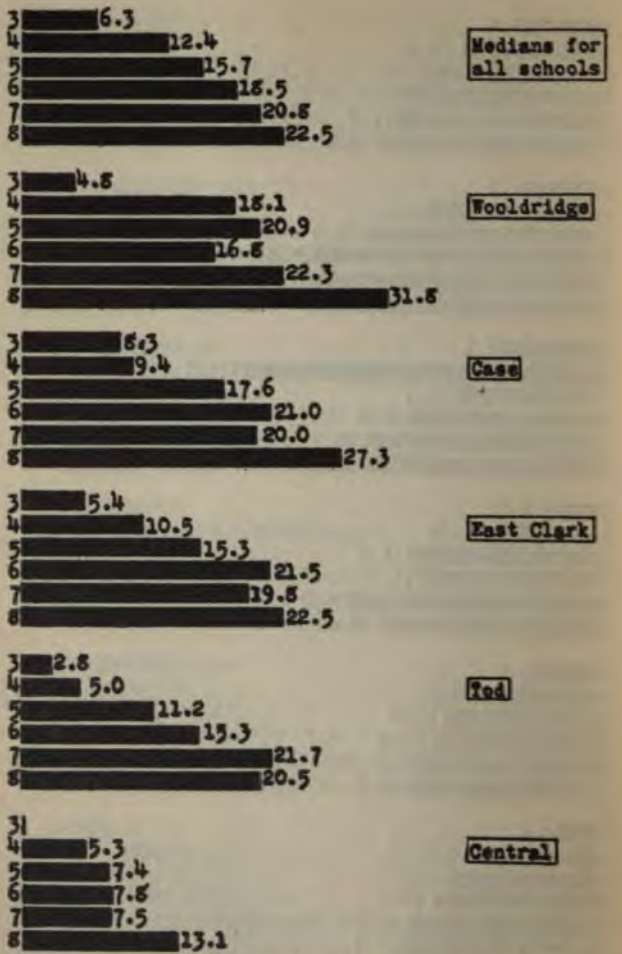


Diagram 27.—Median scores for the whole city and for five schools in Test "D" in simple division

test. The third individual school represented in each diagram is the school which supplied the median for the eighth grade record of the whole city. Finally, two schools are added at the bottom of each of the figures which made a record below the median.

These figures serve to emphasize two points. First, individual schools differ from one another in arithmetic though somewhat less than in tests in other subjects. Second, the regularity of progress through the grades which is exhibited when we take into account all the children in the city is frequently interrupted when we consider merely the children in a single school. For example, if we take the records in Test A, we see that in the Gilbert School the fourth grade for some reason differs notably from the third and fifth grades in that school. Furthermore, the sixth and seventh grades in the Gilbert School fall below the median for the city, while the third and fifth are above. In the Miles Park School the fifth, sixth, and eighth grades are below the median for the city and below the level which one would expect in view of the records made by the fourth and seventh grades. Other striking examples of departure from the normal appear in the other figures. Thus, in the diagram reporting the results for Test C there is a most extraordinary departure from the normal in the case of the Mayflower School. An examination of the curve for this school would seem to indicate that the fourth grade has been much more completely drilled in multiplication than any of the other grades.

Two practical questions are suggested by an examination of these diagrams. The first is the question of correcting the deficiencies of those grades which fall below the normal, and the second is the question of the desirability of carrying the grades which are now beyond the median as far as they can be carried.

In answer to the question of how to meet deficiencies it may be said, first, that the teacher ought to realize that there is a deficiency. Tests of the type here reported will serve to bring out the information which teachers need. Furthermore, an analysis of the type which was undertaken in describing the tests will frequently help to determine the direction in which class work should be carried in order to improve the deficient children.

Such an analysis will often bring out the fact that deficiencies in a given grade are not general but special, requiring drill of a particular type. Thus we may take the record of one of the better schools in the system, as exhibited in Diagram 28. Here a full report is made for this school of all the tests from A to G. If we concentrate attention on the sixth grade, which seems to have serious difficulty in the multiplication test, we see that this sixth grade is only slightly deficient in addition. It is not at all deficient in subtraction or in division. On the other hand, the eighth grade, which seems to be unusually strong in all the simple operations, needs to be drilled, as shown by the results in Test F, in the more elaborate forms of subtraction and whatever is involved

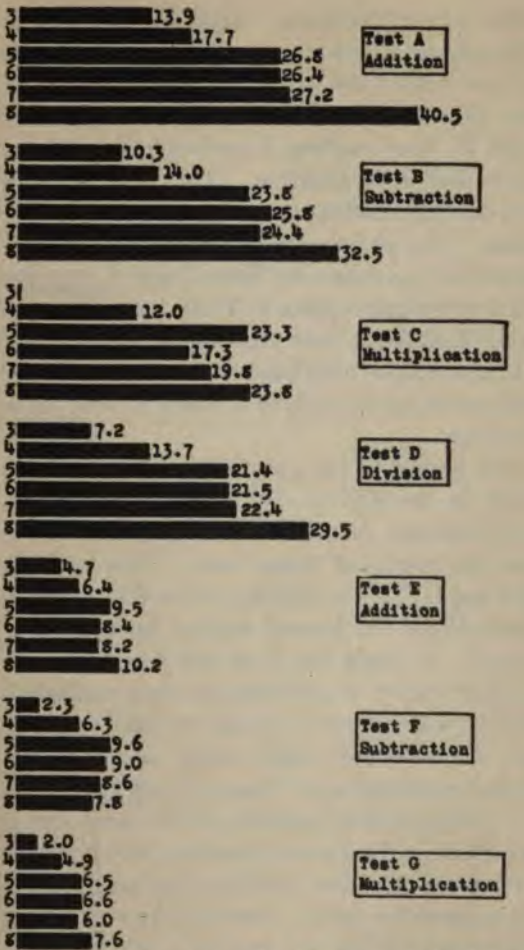


Diagram 28.—Median scores for Outhwaite School for the first seven tests

in that form of thinking. Again, taking another one of the schools which stand well in arithmetic, namely, the Case School, for which the report is given in Diagram 29, we see that the fourth grade is low in Tests A and E, thus making it perfectly clear that some drill is needed in addition. This same grade seems to be entirely efficient in subtraction and in multiplication. The eighth grade seems to be efficient in subtraction, as shown by Tests B and F, but does not hold a conspicuous place in Tests A and E or in Tests C and G, showing that more work ought to be done in addition and multiplication. Evidently schools would profit by an analytical study of their particular difficulties.

With regard to the question whether more energy should be devoted to developing the grades which now stand well, only indirect evidence can be drawn from the results of these tests. This indirect evidence appears in the fact that even the better schools do not exceed the general median by any very great amount. A single test does not determine whether the slight excess of achievement thus exhibited is of sufficient importance to justify the effort put forth in these schools where high results are obtained. A rational supervision of these schools will, however, try to balance effort against achievement and determine whether there is not a point where it is better to wait for development to take place gradually rather than to force the issue. It is not impossible that the norms suggested by the results of the tests are in a certain sense the norms set by children's natures.

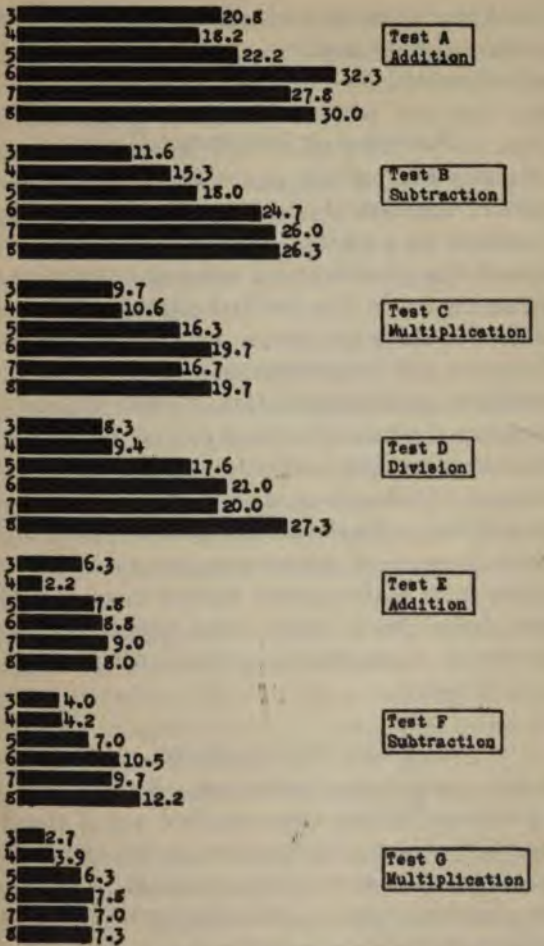


Diagram 29.—Median scores for Case School for the first seven tests

When a grade reaches such a norm, perhaps the time and energy of the pupils can better be spent in other forms of work.

Diagnosis of Individual Cases

The discussions of this report have dealt with the results of this test wholly from the point of view of the system as a whole. It would be a mistake to overlook the possibilities of using the test to throw light on the needs of individual children. There are children, as there are grades, who are competent in subtraction and division, but in need of more training in addition and multiplication. There are children who know the tables, but are lacking in the higher forms of attention involved in the more complex processes. Curiously enough, there are children who are mediocre in the elementary processes, but highly efficient in some of the more complex processes. Each of these cases challenges the teacher to an analytical study of the child's needs. The testing of individuals is quite as productive as the testing of a whole school system.

Recommendations

The recommendations which naturally attach to this chapter grow in very large measure out of the fact, already mentioned, that a new course of study in arithmetic has been put into operation. The results of the tests in arithmetic are so like some of the other results in major characteristics that it seems not unlikely that other courses also need revision.

Furthermore, the problem of making the new course a success is in no small measure a problem of constant supervision. It is urged that the results of the new course be closely studied and that those modifications which the results show to be needed be introduced without delay. The course of study should be subject to frequent revisions in minor details. Such constant revision should depend on the precise knowledge of results which can come only from systematic tests.

Summary

This chapter describes in detail the tests which were made in the fundamental arithmetical operations.

(1) These tests show that the processes of combining numbers increase in complexity, requiring in the later stages of the course concentration of attention and power to carry over results from one relation to another.

(2) The divergence between grades and schools noted in the studies of penmanship and spelling was apparent in arithmetic, though in less degree.

(3) The progress of pupils from grade to grade in individual schools differs from the general type of progress which a study of the city as a whole shows to be normal.

The chapter closes with comments on the new course in arithmetic, on the desirability of reconstructing other lines of work also, and the recommendation that the results of the new course be carefully studied by means of frequently repeated tests.

CHAPTER VII

STUDIES OF READING

In discussing the records of failures in particular subjects, this report has called attention to the fact that the number of failures in reading declines steadily throughout the grades. In view of the fundamental importance of reading as a school art, it is difficult to reconcile this fact with the steady increase in nonpromotions in the intermediate grades. Furthermore, the large number of failures in the upper grades in subjects which require the use of reading suggests that there may be ground for the belief that the favorable record made in reading is not justified.

The careful tests of reading show that Cleveland emphasizes the mechanical or formal side of reading, but does not succeed equally in training the children in the methods of silent reading and thought-getting.

This is not the part of the Survey report * to which is assigned the task of discussing the subject-matter of the reading lessons. It is not out of place, however, to call attention to the vital importance to any system of the selection of suitable reading matter. It

* "What the Schools Teach and Might Teach," by Franklin Bobbitt.

does not profit a community to have its children drilled in formal oral reading if they are not trained at the same time in the art of silent, individual mastery of the printed page. All through life one uses reading, not for purposes of public oral exhibition, but for purposes of gathering ideas. Even the children in the upper grades read silently and must understand and retain what they read or they will fail in geography and history and other content studies. In the high school silent reading is practically the only kind of reading required. The evidence goes to show that Cleveland schools have not realized all this.

Perhaps this is the proper place to refer once more to the fact that Cleveland schools have been very conservative in matters of the course of study. The fundamental subjects, so called, have been given a great deal of time and new lines of work have been brought in with great reserve. It is not for the Survey Staff to decide whether Cleveland is to continue this policy. The business of this report is, however, to point out the results which have come from this policy and to make the antithesis so clear and sharp that the policy of the future may be decided without any doubt as to its consequences.

It is hardly necessary to discuss at length the importance of reading. It is unquestionably the most important subject taught in the public elementary school. It occupies the first place in the program, consuming more time than any other subject. It furnishes the pupils with the instrument which they

must use throughout the school course. Popular emphasis on the terms "literacy" and "illiteracy" exhibits the high regard in which the community holds instruction in reading as related to life beyond the school. From the first, the American school has been a reading school, thus aiming to make the individual intellectually independent. In this respect our schools differ radically from European schools, which depend for the most part on oral instruction, and use text-books much less than we do.

Difficulties Encountered in Testing Reading

It is much more difficult to compare the attainments of individuals or grades in reading than in penmanship, spelling, and formal arithmetic. The process of adding a column of figures requires much the same mental powers wherever it is encountered. Reading a passage, on the other hand, may be a purely formal matter of pronunciation, when it will involve very little intelligence; or it may be a complex mental act, including the most profound interpretations. It is not always easy to determine whether an individual has merely pronounced words or has understood and appreciated what he has read.

Another difficulty in studying reading arises out of the fact that a passage which may appeal to one individual may not arouse the interest of another equally intelligent person or fit at all into his past experience. In view of the diversities in the training of individuals, it becomes very difficult to select

passages which can be used as test passages in comparing abilities in reading.

Study of Rate of Reading Made by All Elementary Teachers

The study of reading in the elementary schools of Cleveland began with an investigation in which all the elementary teachers having charge of grades participated. An easily measured characteristic of the child's reading, namely, its rate, was made the subject of this opening study. It will be shown later, in detail, that rate is parallel in the majority of cases with general efficiency in reading. For the moment, it is enough to point out the chief reason why ability to read rapidly is a fair measure of the mastery which the reader has of the printed page. The poor reader is one who is unable to pass readily from the printed symbol to the meaning. For the poor reader the mere mechanical processes are obstacles and he loses time in trying to perform the preliminary mental acts which are necessary before he can comprehend the passage. In the case of the good reader, on the other hand, the mechanics of the process are very fluent and rapid. The proficient reader has mastered the words and moves on without hesitation to the meaning.

To be sure, there is some possibility of confusion and error if the investigator relies entirely on rate in measuring efficiency in reading. The child who learns the trick of merely pronouncing words may exhibit

speed without reaching the interpretation which is the essential end of the reading process. Error arising from this source is, however, less likely if the child under investigation does not know that his speed is being recorded. If the child can be induced to read in normal fashion, keeping his attention fixed as closely as he can on the meaning of the printed page, his rate will be a clear indication of his training and present fluency. In the investigation which was made for the Survey, teachers were asked to secure the records of rate under such conditions of normal reading.

An effort was further made to give the investigation definite point for each individual teacher by turning it on a distinction which general scientific study has shown to be of major importance, namely, the distinction between oral and silent reading. Oral reading, which is the type of reading almost exclusively emphasized in class instruction, involves the movement of the muscles of articulation. The movement of these muscles is a relatively slow process as compared with the perception and interpretation of words by the trained reader. On the other hand, in the lower grades the perception and interpretation of words is very slow and the child is able to pronounce words quite as rapidly as he can understand them, and in many cases pronunciation is much more rapid than recognition of words. A study of the rates of silent and oral reading is thus a promising field in which to begin investigation.

Complications Encountered in the Study

The investigation suffered so far as the availability of the results for rigid comparisons is concerned because some of the teachers conducted the measurements of rate with distorted conceptions as to their purpose. Some teachers made an undue effort to have their pupils read fast; others told the children about the Survey and turned the investigation into an examination, thus distracting the pupils from their normal attitude. Furthermore, even though the attitude of many teachers was quite uniform, it was not possible to use the same passage throughout the grades.

Passages to be read were of necessity taken from the reading books in the hands of the classes. Finally, the results were complicated by the fact that the passages used for oral reading were sometimes appreciably different in difficulty from the passages read for the silent reading, even though the effort was made to select material as nearly uniform in difficulty as possible.

In spite of these complications, a body of results was obtained which furnishes an excellent introduction to the more nearly exact results which were secured later with standardized test passages, and at the same time the teachers were shown by the results obtained in their own classes that silent reading is a very different process from oral reading.

Contrast Between Oral and Silent Reading

Table 12 shows the number of lines read per minute orally and silently by the children in each grade in 44* schools is as follows:

TABLE 12.—AVERAGE NUMBER OF LINES OF PRINTED MATERIAL READ PER MINUTE ORALLY AND SILENTLY IN EACH GRADE IN 44 SCHOOLS

Grade	Lines read orally	Lines read silently
2	13	16
3	16	22
4	14	21
5	15	20
6	16	24
7	16	21
8	16	21

No effort should be made to compare the results of successive grades with one another because the length of the lines in different readers is different and the content of the passages is of varying difficulty. Even so, it is evident that children read more rapidly when they are free from the necessity of pronouncing words. The fact that there is not a greater difference in the upper grades is undoubtedly due in part to the influence of school training. So constantly are children drilled in oral reading that their habits of recog-

* The 44 schools for which the results are here presented in full were the ones selected with special reference to the exact investigations to be reported later. In the original preparation of the list care was taken to select schools from different localities and of different types. The list may, therefore, be regarded as thoroughly representative. In order to facilitate comparison between the two studies on reading, the same list was adopted for this part of the report.

nition come to be controlled by this dominant form of instruction. Their natural tendency to cultivate rapid silent reading is, therefore, constantly counteracted by rigid school drill in the slow oral form of reading.

Evidence of the difference between oral and silent reading is striking if we examine in detail the records of particular grades. Diagram 30 shows the number of lines read orally and silently by each member of the fifth grades in five schools. In each case it will be noted that in oral reading the pupils are closely grouped together, while in silent reading the tendency is for the class to spread out. In some cases, as, for example, in the fifth grade of the Bolton School and in the fifth grade of the Waverly School, this spreading out is exhibited in an extreme form, while in the fifth grade of the Lincoln School there is much less spreading out.

One reason why children do not differ widely from one another in oral reading is that the rate is controlled in a measure by the physiological rate of movement possible in the vocal acts involved. In silent reading there is no impeding physiological element.

A second reason is the school experience of the class. Every member of the class is drilled in oral reading under methods which are uniform. This drill is carried on through years. Oral reading is thus a highly trained and standardized habit. There is, doubtless, a more or less pronounced effect carried over from the oral drill to the less standardized silent form of reading. The records presented in the dia-

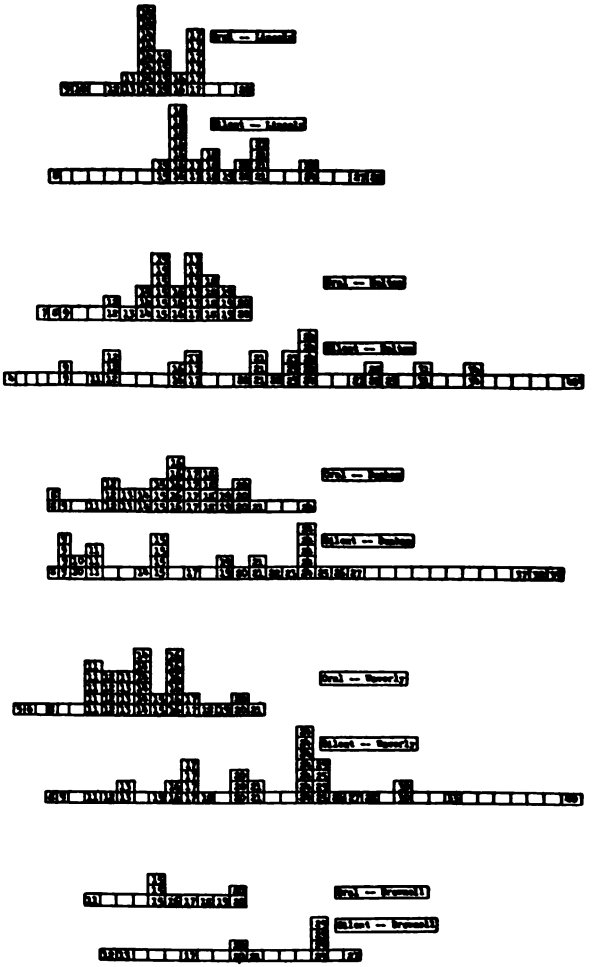


Diagram 30.—Number of lines read orally and silently by each pupil in the fifth grades of five schools

gram suggest that some schools, such as the Lincoln School, control and render more uniform the individual reading habits of children to a much higher degree than do other schools such as the Dunham.

TABLE 13.—FIVE HIGHEST AND FIVE LOWEST MEAN DEVIATIONS IN SCORES IN ORAL AND SILENT READING IN EACH GRADE

	Grade						
	2	3	4	5	6	7	8
Number of grades included in calculation	76	76	68	70	62	52	44
5 lowest mean deviations for oral reading	0.7	1.1	0.8	1.3	1.0	0.7	0.9
	1.5	1.4	1.0	1.3	1.1	1.1	0.9
	1.7	1.4	1.2	1.4	1.2	1.3	0.9
	1.8	1.4	1.5	1.4	1.2	1.3	1.9
	1.9	1.5	1.5	1.5	1.4	1.3	1.1
5 highest mean deviations for oral reading	4.8	3.9	3.5	3.4	3.0	2.6	2.4
	5.1	4.3	3.5	3.4	3.2	2.7	2.5
	5.9	4.4	3.8	3.5	3.4	2.7	2.7
	6.0	4.5	3.9	4.0	3.5	3.6	2.7
	6.3	4.5	4.0	4.1	4.1	4.1	4.0
5 lowest mean deviations for silent reading	1.3	2.7	2.0	2.4	2.0	2.5	0.4
	2.2	2.9	2.3	2.7	2.5	2.6	1.1
	2.5	3.0	2.7	2.9	2.6	2.8	2.0
	2.7	3.0	2.8	3.0	2.9	2.8	2.1
	2.7	3.1	2.9	3.0	3.0	2.8	2.6
5 highest mean deviations for silent reading	8.3	11.4	10.3	7.9	7.7	9.3	5.0
	8.5	11.9	10.5	8.5	8.2	9.3	5.4
	10.6	12.1	11.5	8.6	9.4	10.9	6.3
	12.3	12.2	12.1	9.0	9.5	11.4	7.2
	13.4	15.0	12.5	10.7	9.9	15.5	7.8

Evidence that this wider variation in silent reading is typical throughout the schools and not merely a characteristic of the examples chosen is presented in a calculation covering 44 schools. For each grade in those schools the median rate of reading was selected. The extent to which the record of each child departs

from this median was then determined. This latter quantity is known as the deviation. The deviations for each grade were then averaged and the results are summarized in Table 13 which gives the five highest and the five lowest mean or average deviations for all the grades in the 44 schools. A comparison of the parts of the table dealing with oral and silent reading shows that the facts presented in the detailed figures for five schools are altogether typical.

Silent Reading Should Be Cultivated

Before leaving this part of the report, it should be pointed out once more that there are large unrealized possibilities of cultivating rapid and efficient silent reading. In the diagrams showing results from five schools, there are many cases of children who exhibit high degrees of ability in this respect. Furthermore, scientific studies in general show the possibility of cultivating rates of silent reading that are three or even four times as fast as the rate of oral reading. Cleveland pupils have, therefore, large ranges of possible improvement before them if they can be properly trained. The conclusion seems to be clear that less time should be given in the upper grades to formal oral reading and much more attention should be given to productive silent reading.

Description of Exact Tests

From the introductory studies of the rate of reading, we turn to the more exact tests which were per-

formed in collecting material for the report on reading. For the purpose of making thoroughly scientific comparisons between schools and grades, it is necessary that the tests be performed in all the schools under uniform conditions and with the same passages. Furthermore, the passages used must be selected with a view to supplying definitely known stages of difficulty. These requisites were provided. The members of the senior class of the Cleveland normal school performed the tests. For this task they were trained by demonstrations, discussions, and trial. They went to various schools and were allowed to try the tests in suitable rooms where they could work with individual children without distraction. The passages used were the products of extended studies previously made in other cities. A double advantage arises from this use of material which has thus been rated by previous use. First, the material is standardized; and second, the earlier studies yield comparative results which may be used to supplement the results obtained in Cleveland.

Tests of Oral Reading

The exact tests were divided into tests in oral reading and tests in silent reading. In oral reading the rate was considered and also the following types of error:

a. Gross mispronunciations which include such errors in pronunciation as indicate clearly that the word is too difficult for the pupil.

b. Minor mispronunciations which involve the

mispronunciation of a portion of a word, wrong accent, wrong syllabication, omission of a syllable, etc.

c. Omission of words.

d. Insertion of words.

e. Repetition of words or groups of words.

f. Substitution of one word or group of words for another.

A composite score based on all these items was made up, thus reducing the record of each child and each grade to a series of convenient numerical expressions.

One further word of explanation is necessary in order that the diagrams in which the results are presented may be readily understood. Ability to read a certain passage without error means less on the part of a child in the upper grades than on the part of a child in the lower grades. Grades will have to be compared with each other by recognizing different levels of expectation. These different levels, as determined from the results, can be expressed graphically as indicated by the vertical lines in Diagram 31. Each line represents the scale for a grade and begins below at the point where the score of 10 should be represented. Higher scores can be represented by appropriate distances along the vertical line above 10. In the diagram the lines end at the points where the score of 70 belongs for each grade. The full drawn oblique lines above and below, connecting the successive seventies and tens respectively, indicate the curves of progress which would result if, in the

one case all scores were 10, or if in the other case all scores were 70. The dotted line near the middle of the figure represents the actual record of all the Cleveland schools tested. This average Cleveland

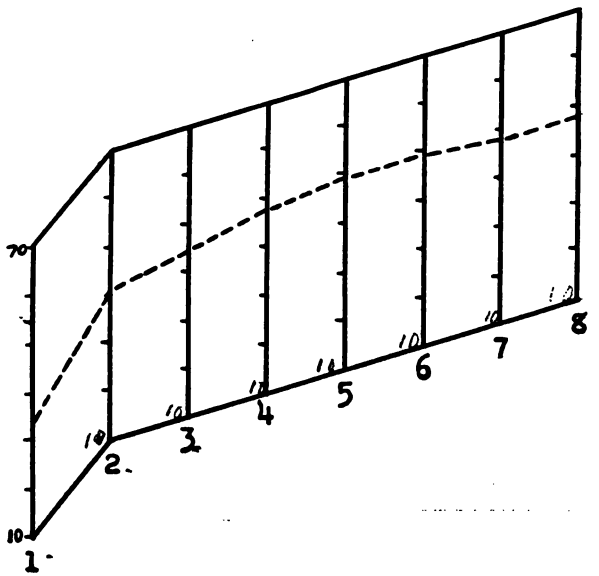


Diagram 31.—Average scores in oral reading of the pupils in the elementary grades of the Cleveland schools

record is the line with which individual schools and other records will be compared. The full presentation of records in oral reading is given in Table 14.

TABLE 14.—MEDIAN SCORES IN ORAL READING IN EACH GRADE IN 44 SCHOOLS

School	1	2	3	4	5	6	7	8
Addison	42	44	40	47	38	..	49	..
Alabama	29	35	47	49	47	49	..	..
Bolton	36	45	47	39	..	43	..	54
Boulevard	30	51	38	49	49	..	50	..
Brownell	28	45	40	33	35	..	43	44
Case	15	49	39	48	54	..	46	..
Case Woodland	33	55	52	56	53	56	51	54
Chesterfield	24	40	52	45	47	51	45	..
Clark	36	33	40	46	..	46	..	48
Denison	40	41	51	48	..	57	..	51
Detroit	44	51	45	..	..	50	..	51
Doan	33	44	55	48	54	..	46	..
Dunham	28	44	50	54	49	47	46	49
Eagle	6	30	39	40	..	30	..	44
Fairmount	28	45	47	45	..	..	49	..
Fullerton	14	44	49	40	..	..	49	..
Hazeldell	27	37	41	44	..	44	..	48
Hodge	50	45	51	48	52	68	46	39
Hough	40	40	51	44	47	54	..	54
Kennard	28	38	46	47	48	..	42	..
Kentucky	21	37	49	54	54	51	57	54
Kinsman	38	34	50	54	53	..	..	..
Lawn	28	24	40	45	..	47	..	50
Lincoln	33	42	50	48	..	54	43	41
Mt. Pleasant	20	43	53	46	51	50	..	48
Murray Hill	34	39	37	34	..	..	..	..
North Doan	52	55	49	52	45	..	51	..
Observation	36	37	47	43	52	48	50	..
Orchard	49	45	42	41	..	45	..	36
Outhwaite	36	49	55	63	56	49	57	50
Quincy	16	44	45	43	38	48	41	48
Rice	37	43	49	51	49	47	52	49
Rosedale	32	51	40	43	48	54	43	40
Sackett	32	46	46	50	50	..	49	..
Sowinski	29	44	46	49	45	49	43	48
Stanard	8	39	41	47	50	..	38	..
Sterling	22	45	45	56	47	58	49	51
St. Clair	18	37	39	52	47	49	49	45
Tremont	16	48	46	50	..	36	..	48
Warren	26	48	43	51	49	..	44	..
Waverly	46	43	49	43	43	..	51	..
Willard	48	43	44	44	41	41	45	47
Willson	30	38	47	50	47	50	45	66
Woodland	35	40	46	48	..	56	..	48
Average	31	42	46	47	48	49	47	48
Q_1	22	28	42	43	45	45	44	45
Q_3	39	47	50	51	52	54	51	53
P. E.	17	19	8	8	7	9	7	8

Variations in Schools

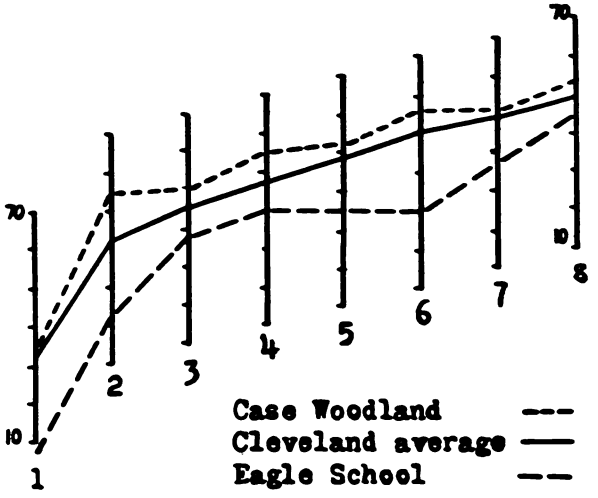
After determining the average, a number of different schools may be compared with the general average. Diagram 32 gives the results for four schools. The Case Woodland School does well in all grades, while the Eagle School attains only a low level, due, probably, to the character of the children. The Kentucky School makes a poor start, but from the third grade on maintains a high level of achievement. The Brownell School makes a fair start but drops below the average from the third grade on. Diagram 33 shows that the Rice School maintains a level close to the average throughout, while the contrast between the Quincy School and the Outhwaite School calls for an explanation.

Another method of exhibiting the variation between schools is shown in Diagram 34. Here all the median scores for 43 fourth grades are represented. Table 14 gives the details in full.

Analysis to Show Influence of Sex, Books, and Nationality

Analysis of the results brings out several important facts. First, in all grades girls do better than boys in oral reading. The facts are exhibited in Diagram 35.

Systems of readers do not exhibit any striking differences when all results are taken into account. The two systems which have been in use for the last two years and a half, namely Ward and Aldine systems, are compared in Diagram 36.



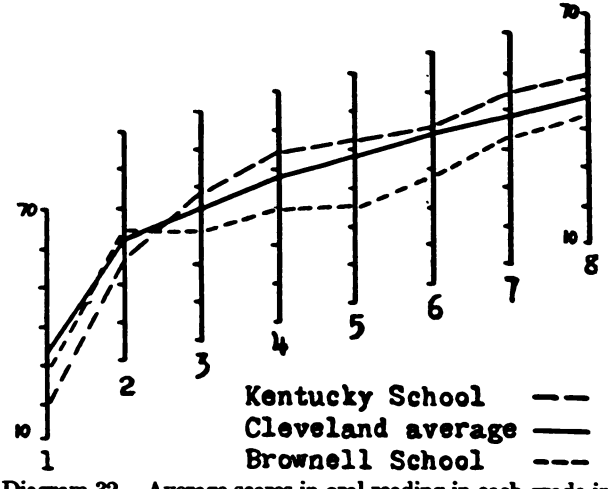
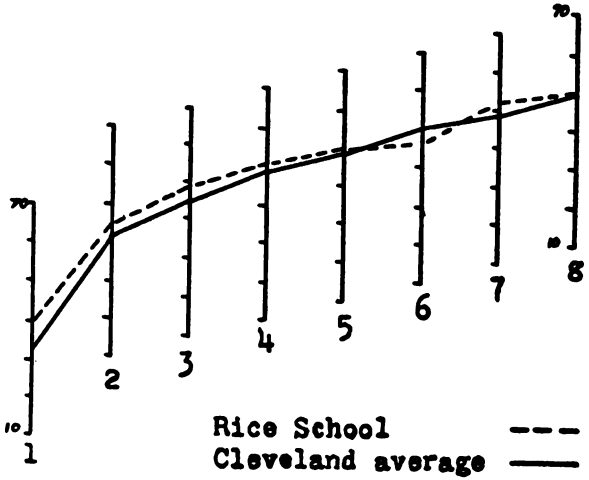


Diagram 32.—Average scores in oral reading in each grade in all elementary schools and in four selected schools



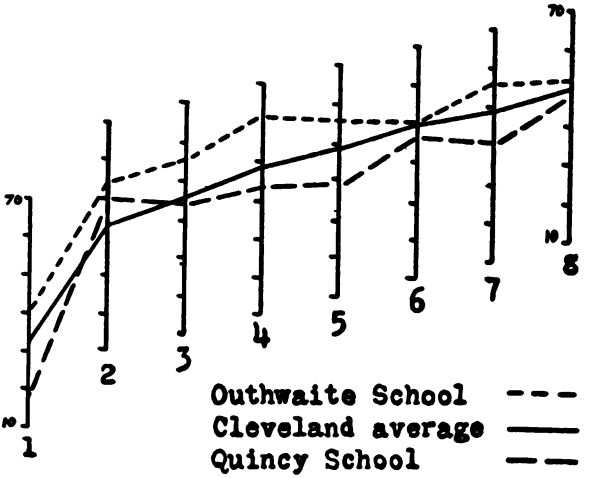


Diagram 33.—Average scores in oral reading in each grade in all elementary schools and in three selected schools

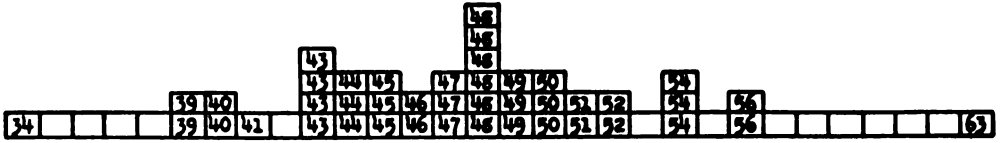


Diagram 34.—Median scores in oral reading for 43 fourth grades

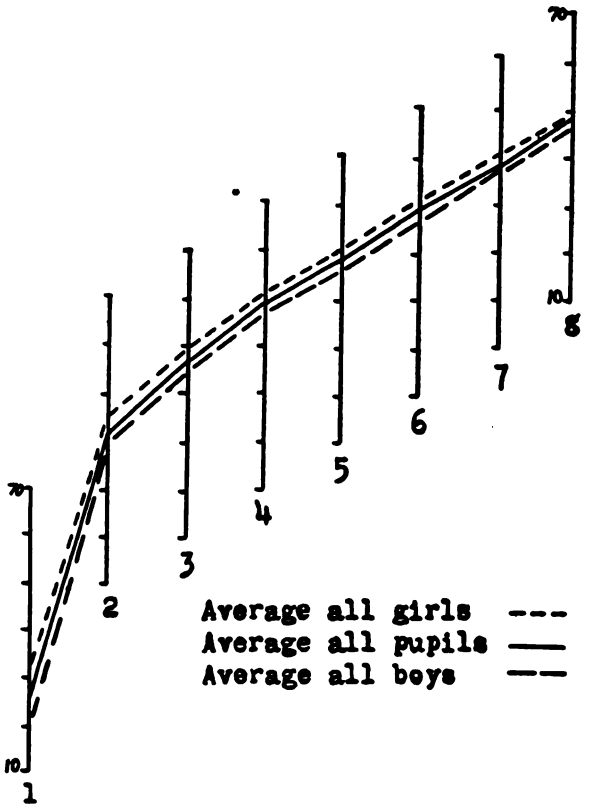


Diagram 35.—Average scores in oral reading for girls and boys in each of the eight grades

The influence of nationality on achievement in oral reading is shown in a general way by Diagrams 37 and 38. The results shown can be accepted only in a very general way for two reasons. The first is that the number of schools involved in some cases is limited. The second is that it is not certain in all cases that all the pupils tested from a school in which a given nationality dominated were of that type. The results are, however, accurate enough to serve in suggesting explanations of some of the earlier results reported for individual schools. In order to secure the data for these diagrams, the average achievement by grades was found for all the schools in which given nationality constituted most of the school's population.

The results show that children of American born parents are superior in achievement during the first three grades and from that point on follow the average very closely. The fact that the American child is not handicapped by unfamiliarity with the English language gives him a slight advantage during the first few years. Italian pupils are seriously handicapped. The sections of the city in which these pupils live are such that factors other than mere lack of English in the homes are probably to be recognized as contributing to the low rank of these pupils.

The children in Jewish schools are distinctly ahead of the average Cleveland pupils. In spite of the fact that they are often surrounded by poor economic conditions and that they often use a foreign tongue, these children seem able to rise above their handicaps

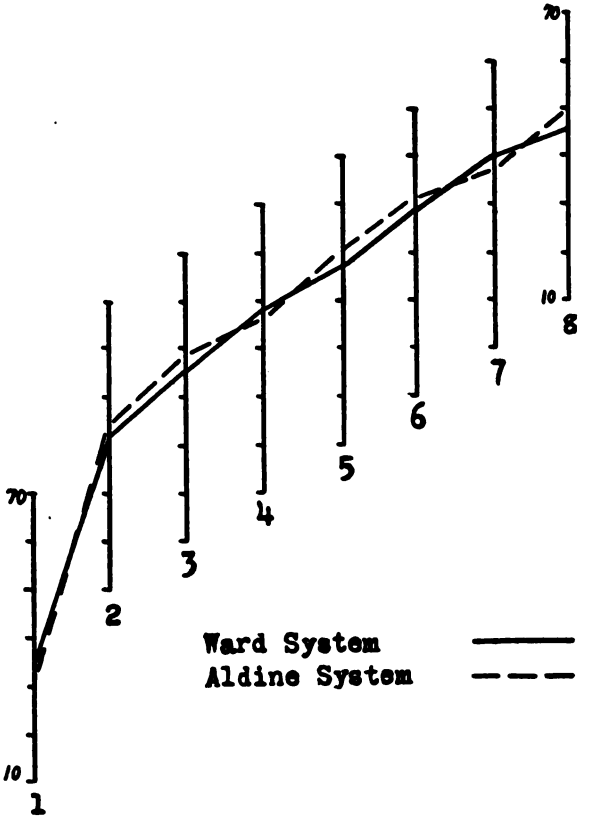


Diagram 36.—Average scores in oral reading in each grade of pupils using the Ward system and of those using the Aldine system

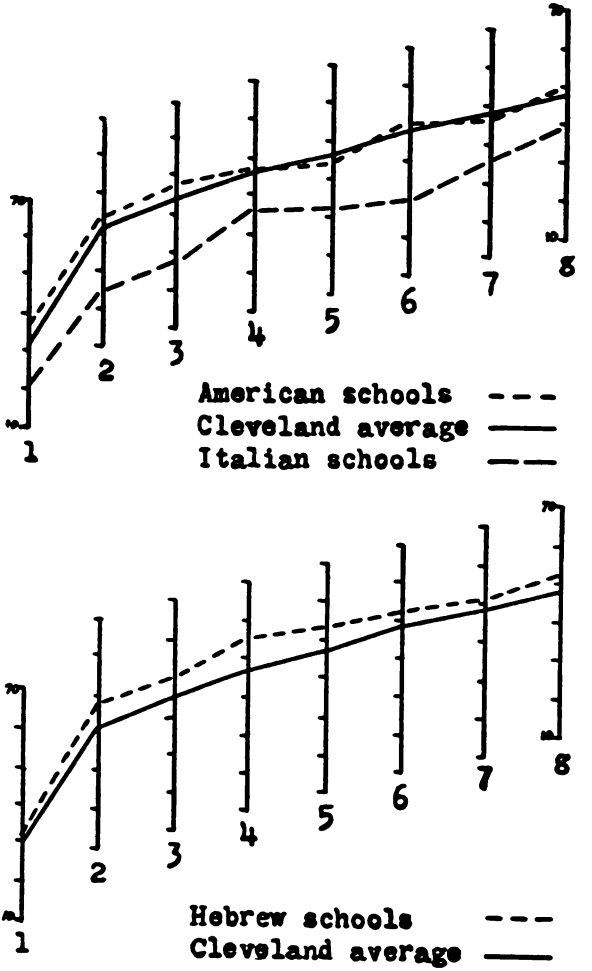


Diagram 37.—Average scores in oral reading in each grade in Cleveland schools in general and in eight American schools, two Italian schools, and three Hebrew schools

better than any other nationality under similar conditions. Poles and Bohemians make slow progress during the first year, follow the average closely for the next four, and then drop below the average during the last three years. Language handicaps doubtless

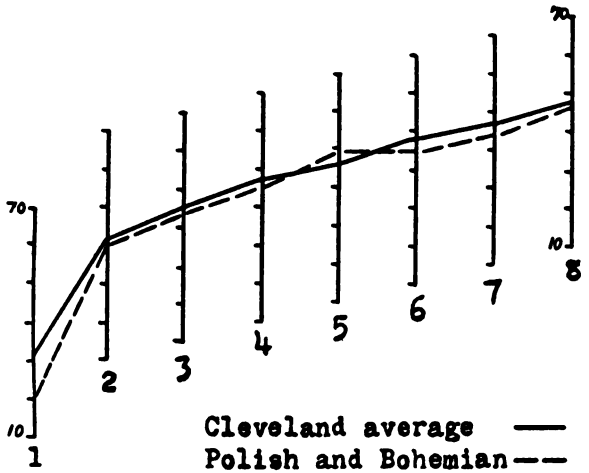


Diagram 38.—Average scores in oral reading in each grade in Cleveland schools in general and in seven Polish and Bohemian schools

will explain the slow start received in the first grade. There are no available data to explain the apparent weaknesses in the upper grades.

Individual Achievement

The individual records of the pupils may be referred to briefly. They reveal the following significant

points: In many third grade classes there were pupils reciting together who ranged in ability from those unable to read as well as average first grade pupils to those able to surpass the average eighth grade pupil. In the intermediate and upper grades, there were a number of pupils who were still unable to pronounce at sight some of the simpler words and stood at a level no higher than that of the average first and second grade pupil. In the grades above the second there were pupils in nearly every class who were excellent oral readers and for whom it is doubtful whether continued daily drill is longer necessary. Some of the deficiencies noted in these cases may be due to lack of familiarity with English, but the last statement regarding oral drill is of importance in determining the methods which should be employed in the schools.

Achievement in Cleveland as Compared with Other Cities

In Diagram 39 the average achievement of the grades in Cleveland is compared with the scores of 23 typical Illinois schools. Comparative data are at hand only for the grades from the second through the seventh. The figure shows that the second, third, and fourth grades in Cleveland are making distinctly more rapid progress than the same grades in Illinois, while the upper grades in each case represent approximately the same level of achievement. Third grade pupils in Illinois are more than one-half year behind third

grade pupils in Cleveland. When it is considered that the school population of Cleveland is largely

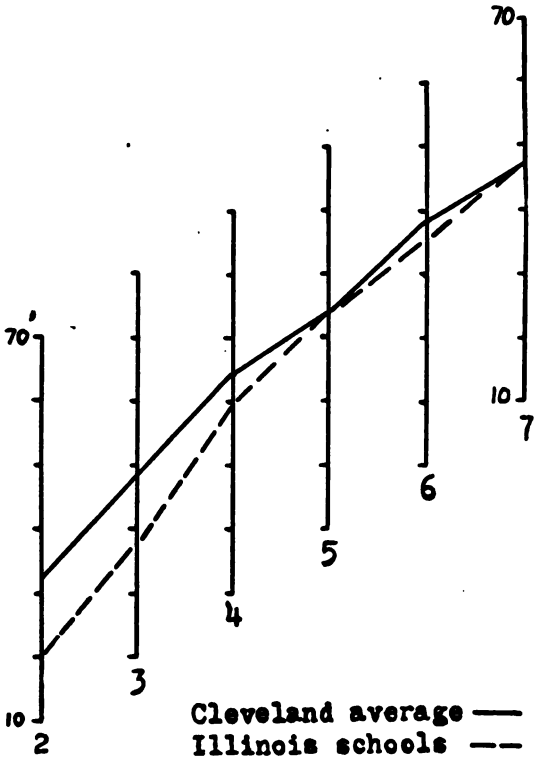


Diagram 39.—Average scores in oral reading in six grades in the Cleveland schools and in 23 Illinois schools

foreign, while that of Illinois is largely American, the fact that Cleveland has developed a high degree of

efficiency in teaching the mechanics of reading in the lower grades becomes doubly impressive.

Gratifying as these results seem, there is a danger which must be pointed out. It is sometimes found that a pupil who has reached the third grade in a school which emphasizes oral reading has acquired an ability to pronounce words which is much in excess of his ability to secure meaning from what he reads. Tests in comprehension which will be reported later in this discussion show that Cleveland pupils are behind pupils of other cities in ability to interpret what they read. Hence it appears that the great fluency with which the pupils of Cleveland pronounce words at sight may have been obtained at the sacrifice of some of the other qualities which go to make up efficient reading.

Tests in Silent Reading

At the same time that the pupils were tested in oral reading, they were also tested in silent reading. The silent test was omitted in the case of the pupils of the first grade. All others were given a new set of passages and the rate of reading and ability to understand what was read were carefully scored. Since three passages were used in order to suit the subject matter to the maturity of the different grades, a readjustment is necessary in the figures. The points of this readjustment are between the third and fourth grades and between the sixth and seventh grades. In Diagrams 40 and 41 a line is drawn

dividing the curves of progress at these points. The numbers at the left of the diagram indicate the number of words read per second in the easy passage; the numbers on the line between the third and fourth grades indicate the equivalent number of words read per second when the second more difficult passage was used; and the numbers on the line between the sixth and seventh grade indicate the equivalent rate for the most difficult passage.

In the diagram reporting quality, the same kind of a correction is introduced at the same points.

Comparison of Cleveland Pupils with Others

The first matter which may be taken up in reporting on the tests of silent reading is that which was discussed in the last paragraphs dealing with oral reading, namely the meaning of the superiority of the Cleveland pupils when contrasted with the pupils in other cities.

The comparison in silent reading is exhibited in Diagrams 40 and 41. Diagram 40 shows, as did the score in oral reading reported in Diagram 39, a marked superiority in the rate of reading on the part of Cleveland pupils in all grades.

In quality, on the other hand, the results are not in favor of the Cleveland pupils. In fact, the results here are decidedly low for Cleveland schools.

These comparative facts raise a most important question. Does quality of reading always fall when

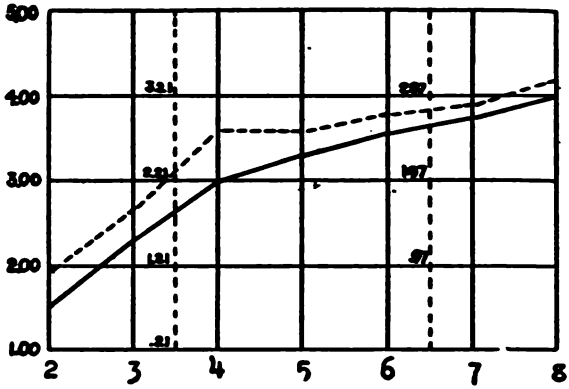


Diagram 40.—Average scores in the rate of silent reading of 1,831 Cleveland pupils and of 2,654 pupils in 13 other cities. Data are for grades from second through eighth. Dotted line shows Cleveland scores and solid line those of other cities

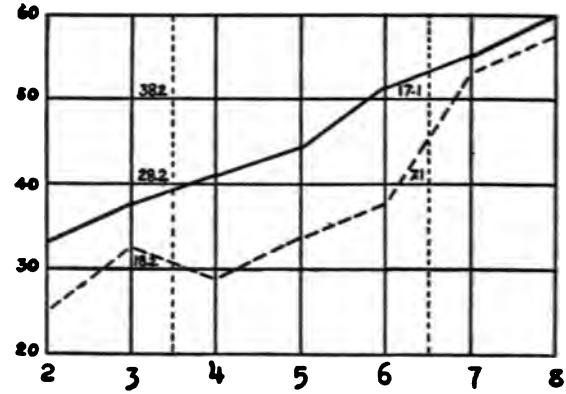


Diagram 41.—Average scores in the quality of silent reading of 1,831 Cleveland pupils and of 2,654 pupils in 13 other cities Data are for grades from second through eighth. Dotted line shows Cleveland scores and solid line those of other cities

the rate rises? Is the result which we find for Cleveland as contrasted with other cities merely an expression of a general opposition between quality and quantity such as was found in the case of handwriting? So essential is it that an answer be found in reply to this general question that an elaborate study was made of all the Cleveland records for the purpose of finding out what is the relation between rate of silent reading and quality.

General Relation Between Rate and Quality of Silent Reading

For the purposes of this study of the relation between rate and quality, all of the individual records of Cleveland pupils were divided into classes. First the speed records were arranged in order from the most rapid to the slowest. The most rapid of these records were designated by the single term "rapid." In this class of "rapid" records were included the most rapid 25 per cent of all the records. In like fashion the slowest 25 per cent of all the records were set aside and designated as "slow." This left half the records, or the middle 50 per cent, which were designated as of "medium speed." In like manner the 25 per cent of all records which were qualitatively the best were designated "good"; the 25 per cent which were qualitatively worst were designated "poor," and the term "medium" was applied to the middle 50 per cent. An individual record must fall then into one of the following nine classes:

Rapid speed and good quality	Medium speed and good quality	Slow speed and good quality
Rapid speed and medium quality	Medium speed and medium quality	Slow speed and medium quality
Rapid speed and poor quality	Medium speed and poor quality	Slow speed and poor quality

It becomes a very simple matter to assign all records in each grade to the appropriate class and determine the percentage of the grade which falls into this class.* Diagram 42 gives the results, the percentages being in each case the nearest whole number to the calculated figures, and the size of the circle being proportionate to the size of the class indicated.

These figures serve to emphasize the fact that good readers are usually not slow and poor readers are usually not fast. It is evidently not safe to attempt to lay down any absolute rule. There are good readers who are slow. In some cases such readers may be temperamentally slow. But even making allowance for such individual peculiarities, the figures show that good reading and slow reading are not incompatible. In like manner there are a certain number of children who read rapidly but retain little of what they read. With the figures in hand a teacher can profitably study her class and determine somewhat more completely than it is possible to do

* In making up the tables whole numbers only were used and pupils of like standing were not separated. This throws the percentages somewhat out of exact conformity to the scheme. The error, however, is very slight.

for the whole school system what are the special explanations of each individual type of ability.

For the purpose of this survey the general fact that high rate and good quality are commonly related, and that low rate and poor quality are commonly

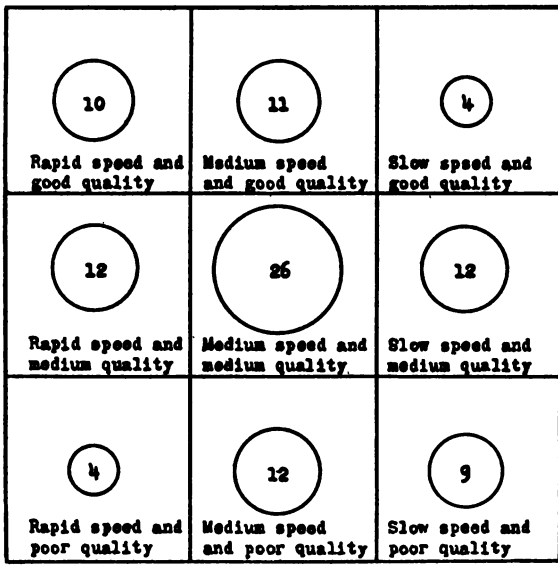


Diagram 42.—Per cent of 1,831 Cleveland pupils found in each of nine speed and quality groups in silent reading

related, is of great importance. This general principle, which stands out as impressively evident in spite of exceptions, leaves us with the complex problem of explaining how Cleveland pupils who are rapid

are less able to give back what they read than are the pupils in other schools tested with the same passages.

Explanation of the Cleveland Record

The problem which is here encountered is solved by a consideration of the relative emphasis on speed and quality in the different grades. Rate and quality may be represented in a single diagram. Thus in Diagram 43 the rate of reading is represented by horizontal distances and quality by vertical distances. The facts in regard to Cleveland and the other cities are presented in the upper part of the diagram. Here we see that the rate of the second grade in Cleveland is about two words per second while the speed of the corresponding grade in other cities is about one and a half per second. The quality of Cleveland's second grades, on the other hand, is 25, while that of the grades in other cities is over 30.

Following the progress of the Cleveland curve, it is noticed that there is a rapid gain in speed up to the fourth grade, shown by the fact that the curve turns sharply toward the right but is irregular in the vertical. Quality is thus shown to be irregular. There is a relapse to a lower level in passing from the third to the fourth grade. Indeed, even after improvement in quality begins in the fifth and sixth grades, it is relatively slow and irregular.

The curve for the other cities has a wholly different character. During the early years rate improves

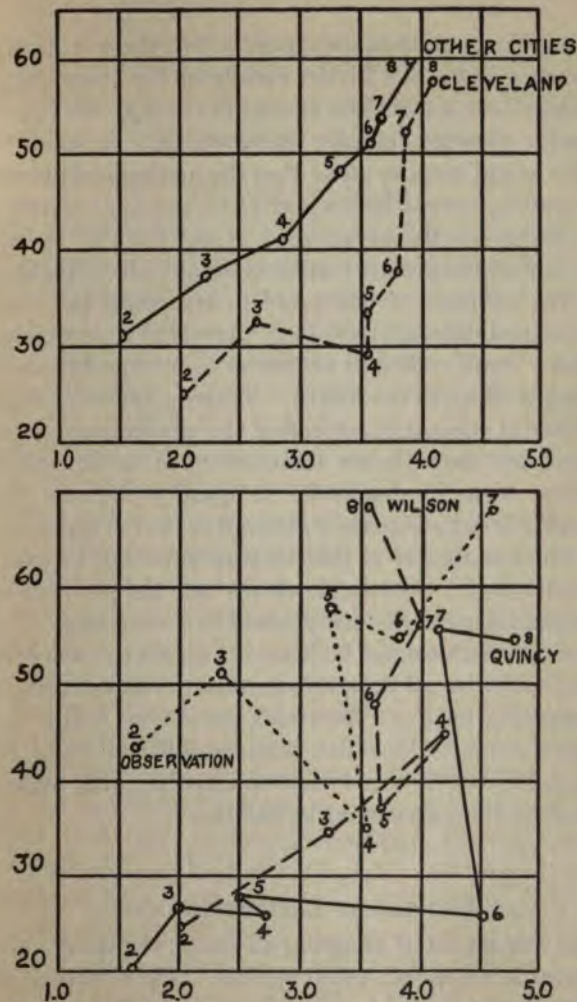


Diagram 43.—Average scores in speed and quality of silent reading in each grade in Cleveland and in 13 other cities and in three selected Cleveland schools

relatively more than does quality, but there is steady progress in both. In the middle of the elementary course there is a definite change in relation, the upper grades showing greater improvement in quality. This would seem to mean that the mechanical phases of reading have to be mastered first and their mastery is shown by the attainment of satisfactory speed; thereafter the greater emphasis should fall on quality.

The solution of our problem regarding the high speed and deficient quality of Cleveland is now clear. There is not sufficient attention to interpretation in the grades up to the fourth. There is, indeed, a high degree of success in perfecting the mechanical operations, but the ultimate achievement of the schools is below what it should be in quality because the quality is not adequately stressed in the lower grades.

The importance of this conclusion cannot be overemphasized. Cleveland schools face the problem of emphasizing quality and content in the reading. The desired result cannot be attained unless the teachers who deal with all the grades realize the importance of improving quality. It would, indeed, be well if the superior rate which has been established could be retained, but if this is not compatible with higher quality, the rate should be sacrificed.

Records of Various Schools

The lower part of Diagram 43 shows the results obtained in three individual schools. These records of individual schools are made up on the basis of the

results of only a few representatives of each grade and might be modified if the whole school were tested. The diagrams are, however, suggestive of a kind of study which would be productive in every school.

Recommendations

The recommendations which issue from this chapter raise certain fundamental questions of school policy. To the Survey Staff the results indicate that more emphasis should be laid on interpretation and relatively less on drill in formal reading. There will be some teachers and school officers who will frankly take the position that it is the duty of the school to stress form in the early years and thus to prepare for a later reading of useful materials.

The first recommendation is that a general study of the effectiveness of the training now given in reading be made by inquiring how much reading is done by those who go out from the schools, especially those who leave early in the course. It would be a great service to education in general and to the schools of Cleveland if such an investigation could be carried out showing how far the results of school reading reach over into practical life. Cleveland is in a unique position of advantage for such an inquiry in view of the size of its school system, its diversified population, and its large industrial and commercial establishments where the effects of training ought to be recognizable. Such an inquiry would do much to bring school reading into contact with life.

The second recommendation is that the matter of

reading be made a subject of aggressive, constructive study on the part of all the teachers. If teachers would prepare reading exercises with the classes and for the classes, they would find that there is abundant material all about them which is not now incorporated into readers. They would realize shortly the formal and unproductive character of many of the present reading exercises.

The third recommendation is that the amount of oral reading beyond the fourth grade be materially reduced at once and that there be substituted silent reading exercises controlled by subsequent discussions and tests both of rate and comprehension.

The fourth recommendation is that a committee of teachers and supervisors be organized to canvass in detail the organization of a course in reading. Such a course should describe, after study of the development of children, the phases of reading which are to be emphasized in each grade. There should be clear and definite progress in reading as in all other subjects. The reflex effect of such a study on the other subjects would be very beneficial and would undoubtedly serve to remove the fundamental difference in the mode of treating reading and other subjects which was shown in Chapter I.

Summary

This chapter opens with a discussion of the fundamental importance of reading, especially reading which leads to intelligent thought-getting. It then reports various tests which show the following facts:

1. There is a sharp distinction between oral and silent reading. Oral reading is slower than silent. Furthermore, the members of a class are more nearly alike in oral reading than in silent reading.

2. The schools of the Cleveland system show in oral reading the same wide variations that have been found in other subjects of instruction.

3. Some of the conditions such as sex and nationality which explain these differences can be discovered. The evidence goes to show that the reading books used do not affect the results.

4. In oral reading Cleveland is ahead of other cities, especially in the lower grades.

5. In silent reading Cleveland is ahead of other cities in speed, but behind other cities in the ability to interpret what is read.

6. In general it can be shown from the Cleveland tests that good quality and rapid reading commonly go hand in hand. Poor quality and slow reading are in like manner commonly related.

7. The explanation of the Cleveland results is found in the fact that the Cleveland schools secure a high degree of speed in all grades but are notably deficient in quality in all grades, especially in the lower grades.

In presenting recommendations, the chapter discusses briefly the fundamental question whether formal drill or efficiency in interpretation shall be sought as the chief purpose of instruction in reading. This report favors unqualifiedly emphasis on interpretation of subject matter.

CHAPTER VIII

KINDERGARTENS AND PRIMARY GRADES

The tests in special subjects have thrown very little light on the problems of the first grade. The study of non-promotions and of failures in reading showed that this grade is confronted by many serious problems. Furthermore, up to this point there has been no discussion whatsoever of the kindergartens and their work. Evidently if there are problems in the first grade they must arise in part out of conditions which are related to the work of the kindergarten. The work of these classes in which the child begins his schooling is of importance in moulding the child's attitude toward school work and in determining his habits in language and in manual activities.

Method of Securing Facts

In order to secure information about the kindergarten and first grade, the Survey enlisted the co-operation of all the teachers in the city who teach in these classes. At the request of the Survey Staff, the Superintendent sent a letter to every school in the city asking that the kindergarten teachers answer the following questions:

1. What are the different kinds of activities undertaken in your kindergarten? For example, do you have paper cutting, gardening, singing, language exercises, etc?
2. How are the time and effort determined which are devoted to each of these types of activity? Do you have a regular program? Does the principal of the school pass on the program or on the work?
3. What phases of the work of the kindergarten aim to prepare directly for the first grade? What are the most striking respects in which the kindergarten work differs from work in the first grade?
4. How far does the first-grade teacher actually take advantage of the work done in the kindergarten?
5. What suggestions can you make looking toward a closer interrelating of the kindergarten and the first grade?

At the same time the first-grade teachers were asked to answer the following questions:

1. How does the work of the kindergarten differ in its methods and content from the work of the first grade?
2. What provisions are made for using in the first grade the results of training given to the children in the kindergarten?
3. What advantages or disadvantages of kindergarten training do you observe in your work in the first grade?
4. Do you suggest any modifications of the present situation especially with a view to bringing

about a closer relation between first grade and kindergarten?

In reply to these requests 157 manuscripts were received from 84 schools. These manuscripts were in some cases prepared by individual teachers and in some cases by two kindergartners writing together or by the whole group of primary teachers in a building. Many of the manuscripts exhibited thoughtful consideration of the problems under discussion and the suggestions which are made seem well worthy of acceptance. The following pages of this chapter will summarize these manuscripts and comment briefly on the explanations of current practices which are reported.

Influence of the Kindergarten Training School

The activities undertaken in the kindergartens of the city seem to be fairly uniform throughout the schools. This fact is undoubtedly explained by the influence of the Cleveland Kindergarten Training School. This school trains practically all the kindergartners in Cleveland. It is maintained and governed by a board of public-spirited women and is to all intents and purposes a public institution. It is, however, in a somewhat anomalous relation to the schools in that it is regarded on all sides as a permanent and controlling factor in the educational system, but it is not answerable to the School Board or the Superintend-

ent. Furthermore, the City Normal School has no bond of connection with this kindergarten school, thereby losing advantages which would be mutual if there were an interchange of training for kindergartners and primary teachers.

The problem of the relation of the kindergarten school to the city system is all the more important because there is no kindergarten supervisor in the city. Furthermore, the replies made by the kindergartners show that supervision by the principals in the buildings is, in general, very slight. The kindergarten is too much a thing apart, unconnected with the rest of the system except in a loose and often accidental fashion.

Kindergartens Well Equipped

The working conditions in the kindergartens seem to be favorable. It is a matter of frequent comment by both kindergartners and primary teachers that the kindergartners have fewer children to manage than the first grade teachers and that they are better supplied with materials and with space in which to do their work. All this is in keeping with the fact that Cleveland has laid great stress on kindergarten training. This city has more kindergartens than most other cities in the country and the salaries of kindergartners in Cleveland are of a high average. With all these favorable conditions the kindergartens ought to be demonstrably of large significance to the school system. At the same time the less

favorable equipment of the first grade raises many serious questions.

Results of Kindergarten Training Not Clear

The evidence supplied by the reports in hand does not clearly show that the large annual outlay which is made each year on the kindergarten is justified. The results of kindergarten training as estimated by either the kindergartners or the primary teachers are extraordinarily vague. The more definite points which are made in favor of this training are that it bridges over the gap between the home and the school, giving children some notion of the ways of life in a classroom and at the same time giving them some notion of their social obligations. Second, dexterity is frequently mentioned as resulting from the constructive work that is carried on in the form of paper cutting, clay modeling, etc. Third, it is stated in some of the reports that children cultivate in the kindergarten a high degree of initiative.

On the other hand, it is asserted with equal emphasis in a number of the reports that the freedom and lack of discipline in the kindergarten tend to unfit children for the first grade. It is asserted repeatedly that kindergarten children talk too much, and are unable to adjust themselves to the restricting conditions of a schoolroom with desks. Again, it is said in opposition to the statement that kindergarten children have initiative, that they are dependent on

the teacher more than children who have not been closely supervised. Some primary teachers say that the children bring nothing definite from the kindergarten, that the first grade cannot expect anything in the way of a reliable background.

Method of Promotion into First Grade Criticized

Furthermore, it is complained by a large number of the primary teachers that the arbitrary method of promotion out of the kindergarten, which depends on the arrival of the sixth birthday rather than on any real achievement on the part of the child, is far from satisfactory because it brings up from the kindergarten the immature and the mature alike. It should be remarked in this connection that the compulsory education law compels the school system to make this kind of promotions. Evidently, if the complaints of these teachers are to be met, there must be a thoroughgoing revision of the relations between the kindergarten and the first grade.

Relation of Kindergarten Training to Work in First Grade

A number of the manuscripts try to make a case for the kindergarten by showing that the regular school subjects are supported by the kindergarten training. Thus it is said that language work in the stories prepares for reading; that the sense-training helps in

number work, and that drawing carries over. On the other hand, it is repeatedly observed that children taught by the play method in the kindergarten come to the first grade with a lack of concentration and with a lack of power of definite work which are harmful. Some teachers assert with emphasis that it is only in the unessential matters that the effect of kindergarten training is shown.

Suggestions as to Closer Articulation

The situation is certainly one which calls for consideration and adjustment. It is interesting, therefore, to review the suggestions that are made for improvement. Almost every manuscript suggests that the kindergartners and first grade teachers meet together for the purpose of bringing about better relations. With so urgent a popular demand on the part of those most intimately concerned, the way ought to be open for productive conferences. It is further suggested that frequent interchange of visits take place. A number suggest that the first grade go to the kindergarten room from time to time and that the kindergarten children be taken to the first grade. Some of these suggestions are couched in phrases which suggest that someone higher in authority than the teacher ought to initiate these changes. A number of the kindergartners suggest vigorously that the primary teachers find out about the kindergarten. A kindergarten course in the normal school for all prospective first grade teachers is several times suggested;

or at least a course of lectures in Froebelian principles. On the other side, a number of the primary teachers argue that the kindergartners ought to be somewhat more explicit in their definition of aims and in their statements of what may be expected from their children.

The Situation in Need of Change

The net impression after a reading of these reports is one of lack of complete adjustment. A traditional kindergarten course given with a high degree of uniformity but with a lack of definiteness of outcome holds its place in a system which is urgently in need, especially in the primary grades, of much larger facilities than it now has.

Quotations

It is impracticable to print the whole body of material sent in, but a few extracts may serve to heighten the effect which the summary aims to produce.

An optimistic kindergartner writes as follows:

"The first grade teachers have generally a sympathetic attitude toward the kindergarten, wishing to correlate their work with ours whenever possible and to supplement what has gone before.

"I would suggest that the first grade teachers be made to realize that the kindergarten has a very definite purpose and mission to fulfil; also that they may expect to find that a year's kindergarten training

has accomplished certain things for the children that those taken directly from home will probably not possess; that first grade teachers could carry on to advantage certain gift work which would be of decided advantage to the child in making him more definite and accurate and at the same time giving him a material suited to his development for self-expression."

In opposition to this view is the following from a primary teacher of long experience:

"I prefer to take children from the home rather than from the kindergarten. The average child taken from the home enters upon work with a serious purpose. Application to the school work in a satisfactory manner is sooner observed. The average child taken from the kindergarten does not seem to care whether the work undertaken is performed properly and honestly or not. There is a lack of the concentration and interest in him, noticed in the child direct from home. If one wished to have the children amuse themselves for a half hour, kindergarten training would be an advantage. Few teachers can realize on this asset. The kindergarten exercises are unquestionably efficient in developing sense perception in very young children. Whether when they enter kindergarten they have not advanced beyond the age when this can be advantageously aided in school is a question."

Perhaps the solution of the matter is to be found in the following recommendation of a group of primary teachers:

"A certain standard should be determined by which the individual kindergarten child might be

tested before he is promoted to the first grade. While the aim of kindergarten is not the acquisition of facts, there is a certain body of knowledge a child should gain through his experience in kindergarten; certain habits should be well started and a definite amount of control, physical and mental, be developed. If the work of the kindergarten is to be closely related to the work of the school, then such a standard must be formulated and children expected to meet it. The testing would, of course, be unconscious to the child."

The following quotation is presented not because it is typical, for there were few such pointed statements in the manuscripts, but because a judgment of this sort from an officer of the public schools is significant. Furthermore, this unusually vigorous statement is supported by numerous less pointed paragraphs in other manuscripts.

"It is only the occasional sympathetic and wide-awake teacher who takes advantage of kindergarten work. To the majority it is as Greek, and so far as interrelation is concerned there is practically none. Private affairs, managed at the discretion of the kindergartners, inadequately supervised, yet supported by public funds, spells the public school kindergartens."

Finally, as a foreshadowing of what is not unlikely to come, the following may be quoted:

"Common supervision for the first grades and kindergartens and a more definite preparation during the last half year of kindergarten training for entrance to the first grade would result in forming a closer relationship between the two.

"It would be a splendid thing to be able with the parents' consent to demote to the kindergarten or to leave in the kindergarten a child who is very immature or especially backward, as such children often waste a whole term in first grade, which seems to be absolutely beyond them, when they would profit greatly by spending the term in kindergarten."

Recommendations

It is recommended that the training of kindergarten teachers be more intimately related to the work of the City Training School for Teachers. It would be well if the training of kindergartners could be made a part of the work of that institution.

It is recommended that the first grade and the kindergarten be organized is such a way that there shall be a more equitable distribution of teaching staff and material equipment.

It is recommended that promotion from the kindergarten to the first grade be based on maturity of pupils and not merely on age.

It is recommended that the work of the kindergarten and of the first grade be reorganized so that each shall have much of natural play and each shall have systematic training in the fundamental social arts.

Since these changes require vigorous, unified central supervision, it is recommended that a single supervisor be put in charge of the kindergartens and primary grades.

Summary

This chapter summarizes the reports of kindergartners and primary teachers on the work which is being done in Cleveland schools with the youngest children. It is pointed out

(1) That the kindergartners are unsupervised and dominated by a training school which is outside the school system;

(2) That the equipment of the kindergartens is superior to that of the primary grades;

(3) That the effects of kindergarten training are by no means clearly defined and that they are often regarded by primary teachers as of doubtful value;

(4) That the teachers are not in close touch with one another and not, in general, in sympathy with the mode of sending children from the kindergarten to the first grade.

These general findings are illustrated by quotations from individual reports and the chapter closes with recommendations favoring a reorganization which shall bring the kindergarten and first grade into closer relations.

CHAPTER IX

RELATION BETWEEN ELEMENTARY SCHOOLS AND HIGH SCHOOLS

The sharp distinction in school organization between the elementary school and the high school comes from a period when most of the pupils of the elementary school did not expect to go on into the higher schools. The high school of 25 years ago was intended for a small, select class. Today the situation is different. Thus, the eighth grade at the close of the school year 1912–13 enrolled 3,924 pupils, 3,625 of whom were promoted at the end of the year. The high school first-year class of 1913–14 enrolled during the first semester 2,870 students.

These figures show conclusively that there is in fact a close relation between elementary schools and high schools. On the other hand, the break in methods and in courses of study is sharp. The first-year student in the high school finds that he is expected to work independently, to do much outside work preparing his lessons, and to assume social responsibilities which he did not know in the grades.

In many cities the transition from the lower schools has been made easy by the introduction into the

upper grades of high school methods of departmental teaching and organization. In Cleveland this has been done in 13 schools. There can be no doubt that pupils in the seventh and eighth grades are physiologically and mentally different from the younger pupils in the lower grades. So important is the recognition of this fact that the junior high school is being organized all over the country as a new link between the grades and the high school. Three such schools were organized in Cleveland with the opening of the present school year.

The junior high school is in a measure a response to the demand for a richer course of study in the elementary schools. The continuation of arithmetic into the seventh and eighth grades, when pupils are mature enough to take the elements of geometry and algebra, has led to all sorts of absurdities. Artificial drills and reviews have been trumped up to fill the time of the pupils. In this respect, the whole country has faced the same problem that Cleveland faces. It is well that Cleveland has taken a part in the junior high school movement and is moving in the direction of a thoroughgoing renovation of the seventh and eighth grades.

Enough has been said to carry the main point of the discussion. There is a community of interest between the elementary schools and the high schools. Such a conclusion leads to the further obvious statement: There ought to be an intimate understanding between the elementary schools and the high schools. This intimate understanding ought ultimately to lead

to an uninterrupted form of organization. In the meantime, examples may be given of the type of information which will stimulate elementary schools and high schools to a more rational handling of students.

Comparison of Records of Standings

One of the simplest problems on which attention can be focused is the problem of a pupil's record or grades when he makes the transition from elementary school to high school. This comparison is useful as an administrative means of checking up both schools. A pupil who enters the first year of the high school comes into contact with those who have received their elementary training in schools very different from the one which he has been attending. The foregoing chapters emphasize the striking differences between elementary schools. When pupils from these different elementary schools work together in the high school the quality of the preparation which they received in the grades is tested through competition. If the pupils from a given school come through this competition well, they demonstrate the efficiency of their elementary school training, at least so far as that training aims to prepare for higher intellectual work. On the other hand, if the pupils from a certain school fall below what may properly be expected of them, that elementary school has something to explain.

The Type of Elementary Students Who Enter High School

The first step in such a study is to determine in terms of the elementary records what kinds of pupils go to high school. The expectation of success in high-

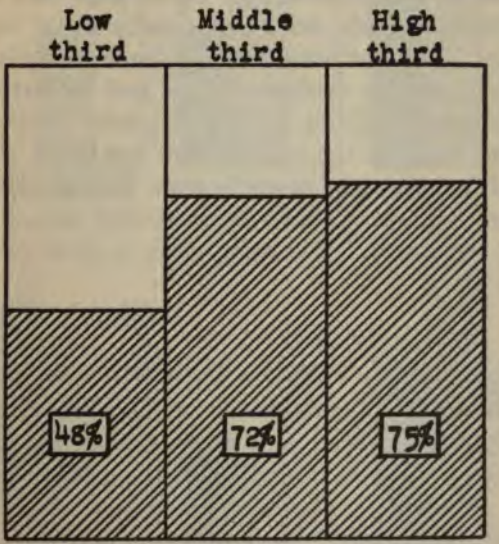


Diagram 44.—Per cent of eighth grade pupils entering high school from the low third, the middle third, and the high third of their classes

school work is, of course, very different in the case of a child who has done excellent work in the lower school from the expectation of success in the case of a child who has made a low elementary record. The elementary records of all pupils entering the high

school in 1914 were accordingly collected. This was done by securing individual record cards for each pupil. Full returns were secured from 84 elementary schools. Since it is difficult to compare the grading systems in use in different schools, the simple device was adopted of dividing each eighth grade into three subdivisions, each made numerically equal to the others. The first third included the best pupils, the second third the mediocre pupils, and the last third the lowest pupils in the eighth grade. When the returns from all the schools were combined, it was found that many more pupils from the highest third of the elementary grades go on to high school than from the lowest. The comparison is given in Diagram 44.

Differences between Individual Schools

The records from various schools were next taken up, and it appeared here, as in all the studies reported in preceding chapters, that there is the greatest difference between schools. Six schools are reported in full in Diagram 45. Each column in this diagram is proportionate in height to the number of pupils going from a certain subdivision of an eighth grade to the high school. Thus, in the case of the Barkwill School the larger column at the right represents 10 pupils who went from the highest third of the eighth grade. The smaller column at the left represents four pupils who went from the middle third. In this school there were none from the lowest third. On the other

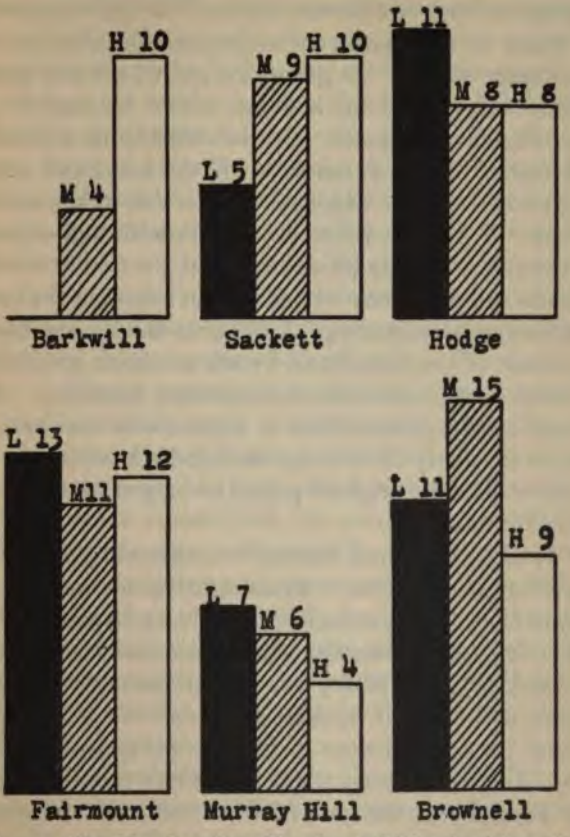


Diagram 45.—Number of pupils going to high school from the low third, the middle third, and the high third of the eighth grade classes in each of six schools. Black indicates low third, shaded middle third and outline high third

hand, in the case of the Hodge school the largest group is from the lowest third of the eighth grade.

Some of these differences are undoubtedly due to economic causes. In general, a girl who is not especially bright will be kept in school because it is socially advantageous. On the other hand, a family of limited financial resources will not make any large sacrifice for a boy who does not do well in his school work. Where mediocre boys go on with high-school work it can usually be inferred that the family is well conditioned. A boy who is kept in school in the face of failures almost always belongs to the leisure class.

Some of the differences between schools are to be traced to the attitudes of elementary teachers. In some eighth grades there is enthusiastic encouragement for every child to go on into high school. In others only the brighter pupils are urged to continue their educations.

Finally, the pupils themselves cultivate traditions. If a boy who is a leader in an eighth grade intends to go to high school, especially if he has a strong preference for some particular high school and talks about what he is going to do, it is very probable that other boys will become equally enthusiastic. If, on the other hand, the leader of the class is going directly into a shop to learn a trade, he is likely to carry many of his fellows with him. Leadership of the type which makes pupils thus influential is not always synonymous with intellectual leadership.

Method of Comparing Records

Having secured the elementary school records, the next step in the investigation was to secure on each individual card the high school record of the student. As before, the whole class was divided into thirds and those in the highest third in each of the high schools were marked with the rank 1; those in the middle third were marked with the rank 2; and those in the lowest third with the rank 3. If now a given student maintains in the high school the rank which he had in the elementary school, he furnishes so far forth evidence that the elementary school preparation has equipped him for high school work. Needless to say, judgment regarding the work of an elementary school cannot be made to rest upon a single record. If, however, the whole group who went from a given elementary school to high school maintains its rank, the inference is safe that the preparation given by that school is good. Conversely, if there is consistent failure in the group from a given school to maintain rank, that school must be judged as having different standards from the high school and from the other elementary schools the pupils from which enter into the competition for rank in the first-year class of the high school.

The preparation of a table showing how far elementary schools maintain their ranks is complicated somewhat by the general fact shown in Diagram 44, namely that there are more pupils of the first rank in elementary school who go to high school than there are from either the second or the third rank.

Evidently when these numerous first-rank pupils meet in the high school, some of them will be forced back into the second rank because of the mere mathematical necessities of the case. This fact must be taken into account; but a single computation clears up the matter and leaves the possibility of determining with great precision how far each elementary school maintains itself in the high schools.

A table thus comparing the elementary schools to be most useful for administrative purposes should be based on the experiences of a number of years. It sometimes happens that a particular eighth grade does not represent a school adequately. Furthermore, a continual repetition of this type of comparison is desirable because some elementary schools send so few students to high school in a given year that their high school records may be distorted by accidental conditions. With these limitations the results may be relied on as representing the relation between high school ranks and the ranks of each elementary school.

Table 15 gives the results in full. The total of all the ranks received in the high school is given for each school and also the total of all ranks received by these pupils in the elementary school. The total for the elementary school ranks is corrected so as to allow for the mathematical necessity described in an earlier paragraph. For the purpose of reducing each record to a single figure the elementary school total is divided by the high school total. When the result is more than 100 per cent it means that the elementary

TABLE 15.—EFFICIENCY OF 84 ELEMENTARY SCHOOLS IN PREPARING THEIR GRADUATES FOR WORK IN CLEVELAND HIGH SCHOOLS

School	Number of pupils	Number of high schools	Sum of rankings in high	Sum of rankings in elementary	Per cent of efficiency
Miles	20	4	42	29.80	71
Barkwill	14	2	24	17.46	73
Hicks	5	3	9	6.57	73
Quincy	22	2	52	40.43	78
Mill	22	3	51	40.41	79
Boulevard	3	2	7	5.77	82
Lawn	11	3	21	17.25	82
Sowinski	29	5	62	50.73	82
Tremont	21	4	49	40.61	83
East Madison	39	5	78	65.45	84
Woodland	30	2	60	50.80	85
Longwood	13	3	26	22.30	86
Mayflower	40	3	94	80.44	86
South Case	49	3	95	82.19	87
Harmon	10	2	21	18.53	88
East Denison	24	3	57	50.65	89
Huck	8	2	12	10.64	89
Marion	16	4	34	30.12	89
Orchard	23	4	51	45.55	89
Willard	36	3	76	67.36	89
Clark	17	3	33	29.84	90
Detroit	15	3	27	24.36	90
Kentucky	47	3	103	92.86	90
Broadway	28	2	54	49.36	91
Giddings	50	5	112	101.40	91
Gilbert	4	2	8	7.24	91
Memorial	7	2	13	11.77	91
Warren	28	4	61	55.33	91
Parkwood	34	3	70	64.31	92
Wade Park	67	5	145	133.36	92
Milford	15	3	29	27.05	93
Sibley	46	5	106	98.96	93
Deaf	2	1	3	2.82	94
Warner	17	3	32	30.35	95
Dawning	3	2	5	4.80	96
North Doan	19	2	40	38.58	96
Nottingham	6	2	11	10.59	96
Sterling	26	3	53	50.66	96
Waverly	25	4	54	51.72	96
Central	18	3	38	36.80	97
Doan	78	5	162	158.59	98
Moulton	6	1	14	13.72	98
Case	7	4	13	12.88	99
Stanard	11	4	20	19.71	99
Waring	11	3	18	17.80	99

TABLE 15.—(*Continued.*)

School	Number of pupils	Number of high schools	Sum of rankings in high	Sum of rankings in elementary	Per cent of efficiency
Brownell	34	4	71	72.71	102
Fowler	17	3	32	32.60	102
Union	12	3	22	22.53	102
Rosedale	59	6	115	118.43	103
Dike	16	3	26	27.16	104
Lincoln	14	4	24	24.89	104
South	23	3	44	45.78	104
Walton	19	3	35	36.23	104
Bolton	97	8	184	192.28	105
Murray Hill	15	5	30	31.44	105
Landon	37	3	65	68.65	106
Beckett	23	3	44	46.65	106
Dunham	69	5	136	146.91	108
Hodge	27	6	55	59.44	108
Hough	93	4	187	201.86	108
Mound	5	2	10	10.77	108
Haseldell	32	3	54	58.72	109
Wooldridge	24	4	61	66.52	109
Denison	56	3	106	119.14	112
Mt. Pleasant	11	3	17	19.01	112
Kinsman	23	4	39	44.06	113
Miles Park	38	5	65	73.66	113
St. Clair	9	5	16	18.05	113
Case Woodland	45	5	91	103.55	114
Fairmount	35	4	67	76.63	114
Gordon	28	3	52	59.29	114
Buhrer	18	3	32	36.69	115
Outhwaite	64	5	110	125.98	115
Willson	39	6	66	76.10	115
Kennard	1	1	2	2.34	117
Scranton	22	4	42	48.99	117
Halle	20	4	33	38.84	118
Harvard	17	5	32	38.11	119
Fullerton	9	2	15	17.95	120
Fruitland	14	3	26	31.70	122
Columbia	52	4	83	102.10	123
Tod	9	2	14	17.53	125
Watterson	17	2	27	34.03	126
Memphis	20	2	31	40.56	131
Total	2,195	11	4,306	4,305.80	100

school pupils have more than held their rank. When the result is less than 100 per cent, it means that the pupils have fallen below legitimate expectations. The ranks of the various elementary schools have been checked up in detail with the observation cards and with the results of other tests. There can be no doubt that the percentages are significant in all the schools where the numbers are reasonably large. In general, the evidences from all quarters justify this method of evaluating the work of an elementary school.

The further use of these records for the purpose of studying the high schools will be postponed to the next chapter where all matters relating to the high schools will be taken up.

Recommendations

It is recommended that a very general and very thorough revision be made of the work of the upper grades. Such a revision should bring in many new and productive lines of study and should encourage the tendency, which is year by year becoming more general, of attendance on the high schools.

It is recommended that the upper grades be more generally departmentalized and that as rapidly as possible junior high schools be organized at many centers. This will make higher education more accessible to all the children in the city and will bridge over the gap which now appears between elementary courses and high school courses.

It is recommended that a more careful study be

made of the pupils who do not go into the high schools. A study of the needs of such pupils will reveal many additions to the course which are needed to make school work useful and attractive to students.

It is recommended that meetings be arranged which will bring high school teachers and elementary teachers together. There is at present a very wide separation between these two groups. Such a separation is undesirable and even harmful.

Summary

This chapter deals briefly with the relation between elementary schools and high schools, chiefly with that aspect of the matter which has to do with the lower school.

(1) It is shown that the relation is growing more intimate in view of the increasing attendance on the high schools.

(2) It is pointed out that special types of organization, such as departmental courses and the junior high school, are arising to bridge over the gap.

(3) It is shown that the better pupils from the elementary schools are the ones who most commonly go on.

(4) A device for rating the elementary schools in terms of the success of their pupils in the high school is described and a full table of elementary schools is presented.

The chapter closes with very urgent recommendations looking toward the more intimate cementing of elementary schools and high schools.

CHAPTER X

HIGH SCHOOLS

Some years ago Cleveland launched the experiment of a divided high school system. Technical and commercial courses were organized in schools wholly separated from the traditional academic schools. A long school day is recognized as necessary for the technical and commercial courses, while the academic day is short.

There are a number of consequences which flow from this sharp distinction between courses and schools. Competition has resulted and has seriously handicapped the schools. The technical and commercial teachers have received higher salaries than the academic teachers because they have had a longer teaching day. As a result, academic principals have had difficulty in securing the highest grade of teachers in some lines. Competition for students has been keen. The superior modern equipment of the technical schools acts as a very strong magnet to students.

The disadvantages of such competition are evident to even the casual observer. The high schools, instead of constituting a strong co-operating system, are working in isolation. The quality of instruction

is very uneven and there are no strong central co-ordinating agencies.

Fortunately the Board of Education has taken steps to remove the most serious causes of these unfortunate conditions. Within the past few weeks a resolution has been adopted by the terms of which all the high schools will have a uniform long school day and all the teachers will be paid on a uniform salary schedule beginning with September, 1916. These are wise steps and it is most fortunate that they have been taken.

In the spring of 1915 the academic principals adopted a course called the English course, which was designed to increase the attendance in the academic schools. This course is frankly described as easier than the regular academic course. No more striking evidence can be adduced of an unwholesome attitude of competition.

The central supervision of the high schools is wholly inadequate. The Central High School is, through special arrangement, regarded as outside of the district system. While the other high schools are nominally under the district superintendents, they are, in fact, very little supervised. The Superintendent has found it impossible, in view of the urgency of problems connected with the elementary schools, to take time for vigorous organization of the high schools. Unfortunately, also, some of the high schools are affected by political controversies, past and present, to an extent which very materially and detrimentally influences their work.

As the high school system stands, it is not an efficient agency for the education of the young people of Cleveland. It needs an active central organization which will eliminate unworthy competition and secure higher standards and more uniform accomplishments of work.

Study of High Schools

It is a much more complex problem to determine the efficiency of a high school than to form an estimate regarding the character of the work done in an elementary school. The elective system in the high school scatters the students so that no single test can be devised which touches alike the whole body. Furthermore, the variety of methods of instruction which are accepted as appropriate in the different subjects, and the still greater variety in the ends aimed at by different students, make it very difficult to cast up any simple sums of deficiencies and excellences on the basis of which a high school can be praised or criticized.

The best basis on which to attempt an estimate of high schools is the routine record of ordinary work. The examination of such a record yields many facts which go far toward justifying final judgments. This chapter will be devoted, accordingly, to the discussion of several lines of evidence, all taken from the routine records of the high schools of Cleveland.

Ranks of Entering Students

First, the investigation which was described in the last chapter yielded facts showing that the students who enter the different high schools are of different types. It will be recalled that the elementary school records were secured for all pupils entering the high schools in 1914. These were distributed so as to show the ranks of pupils entering each of the high schools. The results are presented in Table 16. In this table rank 1 means that the student is in the highest third of the elementary class, rank 2 that he is in the middle third, and rank 3 that he is in the lowest third.

TABLE 16.—PER CENT OF PUPILS ENTERING EACH HIGH SCHOOL IN 1914 WHO WERE IN THE HIGHEST, MIDDLE, AND LOWEST THIRDS OF THEIR EIGHTH GRADE CLASSES IN THE ELEMENTARY SCHOOLS

High school	Per cent marked 1 by elementary school	Per cent marked 2 by elementary school	Per cent marked 3 by elementary school
West	51.5	34.1	14.4
Lincoln	50.9	35.1	14.0
Glenville	47.5	30.9	21.6
East	44.9	34.1	21.0
Central	44.6	34.9	20.5
West Commerce	44.2	39.5	16.3
South	36.8	42.1	21.1
Collinwood	34.8	39.1	26.1
East Commerce	29.7	43.7	26.6
West Technical	28.7	37.3	34.0
East Technical	27.9	39.2	32.9

The same facts are presented in graphic form in Diagram 46.

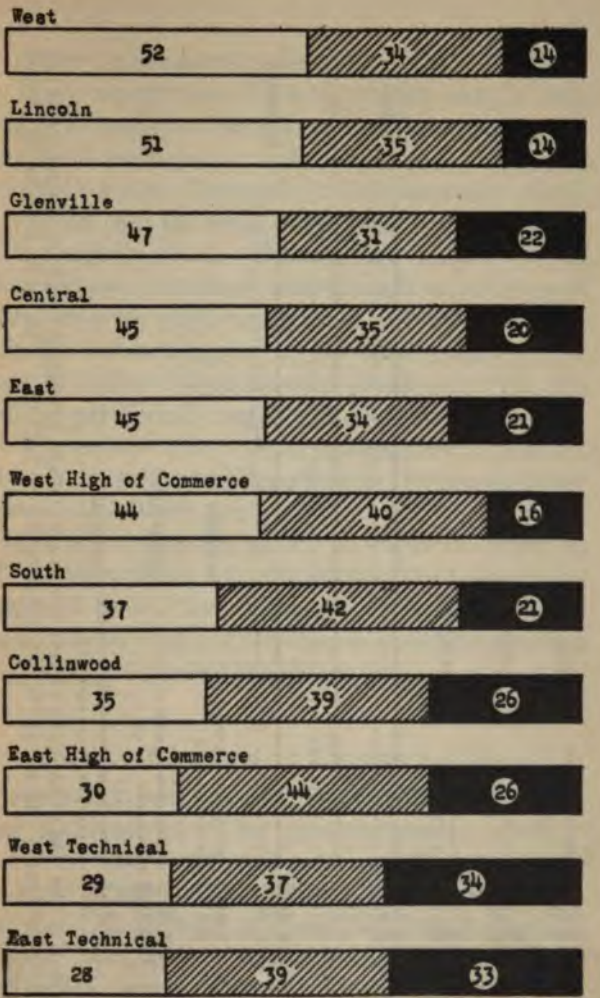


Diagram 46.—Per cent of pupils in the freshman class of each high school who came from the high third, the middle third, or the low third of their eighth grade classes. Portion in outline indicates high third, shaded portion indicates middle third, and black indicates low third

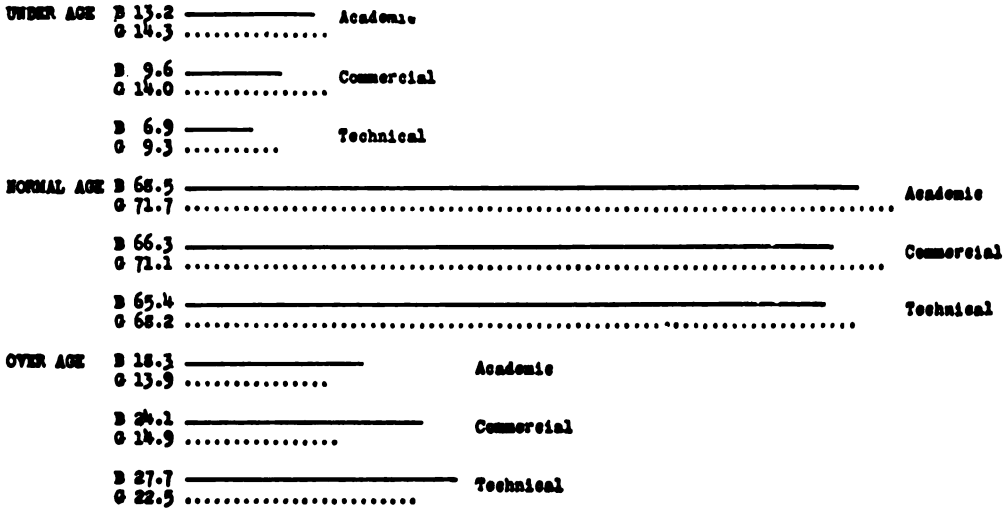


Diagram 47.—Per cent of boys and of girls under normal age, of normal age, and above normal age in the three groups of high schools in the first semester of 1913–14. Full drawn lines, boys; dotted lines, girls

It may be remarked at once that there should be no hasty acceptance of the conclusion that a high school is unworthy because it receives a large percentage of pupils who received low rank in the elementary schools. Low rank in the elementary school may mean that the pupil found little to interest him in the eighth grade. Perhaps the kind of work offered in the elementary school ought to be changed rather than the pupil condemned. The fact that the technical schools appeal to low-rank pupils would seem to indicate that there is justification for the demand persistently urged that the upper grades of the elementary school be so modified as to give an opportunity to do something besides the conventional type of elementary work.

Without attempting at the moment to follow in full the arguments for and against the contentions suggested in the last paragraph, it will be well to confirm more fully the statements about the student body which suggested the discussion.

Ages of Students in Various Schools

A significant body of facts is printed from year to year in the report of the superintendent. Table V in the seventy-eighth report gives the ages of all students in high school. This table throws light on our problem, because it shows how many students entering each type of high school have been either fast or slow in completing their elementary education and continuing their high school work. Thus the

normal age of a student in the first year of the high school is 14 or 15. The normal age for the second year is 15 or 16, and so on. If a student in the first year is 13 years of age, he has done the elementary work more rapidly than usual and is probably a favored individual. On the other hand, if he is 16 or 17, he must have encountered some delay in his career. He may have come from unfavorable home surroundings; or he may have been sick; or, finally, he may have lost time through failure at some point in his work. Diagram 47 presents the facts for the various types of schools reduced to a percentage basis.

Two facts stand out clearly in this diagram. First, the academic schools have the largest number of students who have made rapid or normal progress, while the technical schools have the largest number of students who have been delayed. The commercial schools stand between the extremes. Second, the girls are always younger than the boys in all the schools.

The facts here reported confirm the conclusion based on Diagram 46. The academic schools get more of the pupils who have made rapid progress.

Withdrawals and Non-promotions

A further set of facts important for this discussion may be extracted from Table V of the Superintendent's report. Withdrawals and non-promotions in the different types of high school are significant,

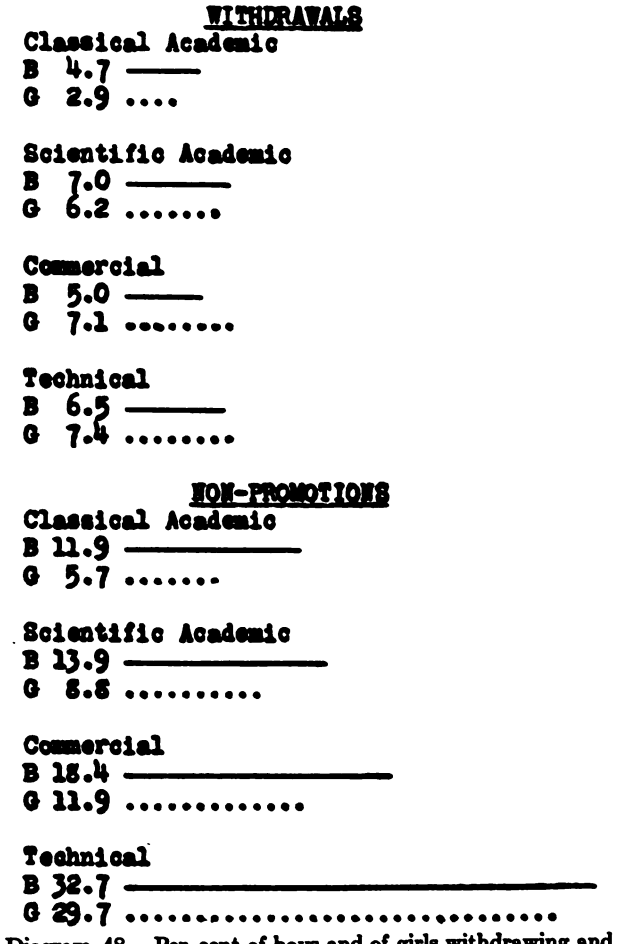


Diagram 48.—Per cent of boys and of girls withdrawing and per cent not promoted in the different high school courses in the first semester of 1913–14. Full drawn lines, boys; dotted lines, girls

because they show what students cannot carry on the work of the high school or are not interested enough to do this work. The facts are given in percentages in Diagram 48. This diagram presents clear evidence that the students of the commercial and technical high schools cannot satisfy the requirements of these schools as readily as the students who go to the academic schools succeed in satisfying the requirements of those schools. Students fail in the technical schools in very large numbers, and the rate of withdrawal in these schools is somewhat higher than in the others.

High School Grades in the First Year

Some further light is thrown on the practices of the different high schools by a study of the way in which they grade members of the first-year classes. It will be remembered that the individual cards of all the first-year students gave the high school record in detail. For the purposes of earlier studies these cards were distributed into highest third, middle third, and lowest third for each high school. Coming back to the cards, it is possible to determine what is the lowest mark given to a student in the highest third of the class. In like manner the highest mark given to students in the lowest third can be determined. The full results for both the fall class and the midwinter class are given in Diagram 49 and Table 17, except for West Technical High, which does not use the percentage system of marking and therefore cannot be directly compared with the other

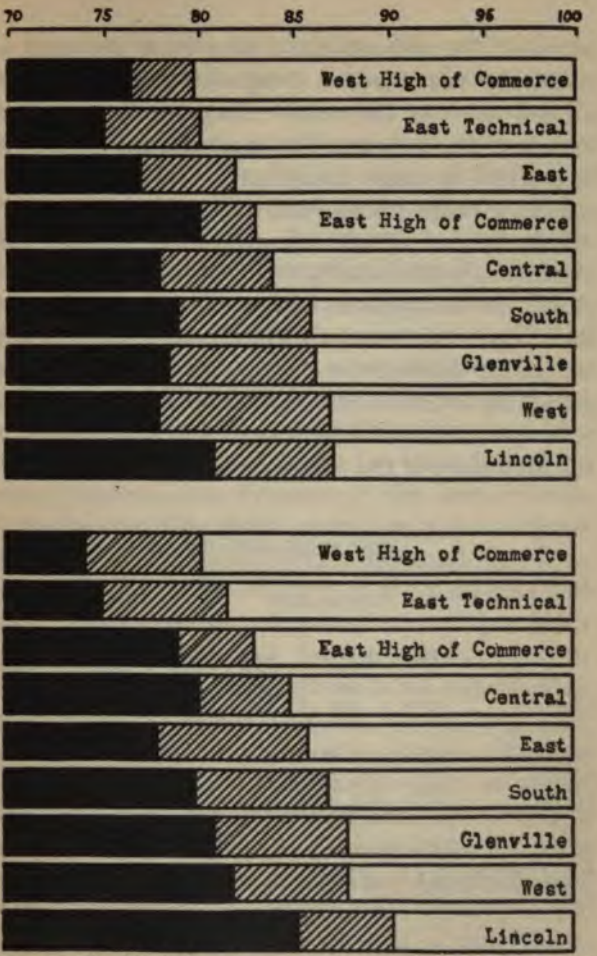


Diagram 49.—Variations in marking systems in the Cleveland high schools. Portion in black indicates students receiving the lowest third of the marks, shaded portion the middle third, and portion in outline the highest third. Upper part of diagram refers to students entering in September, 1914, and lower part to those entering in February, 1914

schools. The schools have here been arranged in such order that there is a regular gradation for the highest third of the class. Diagram 49 should be interpreted as follows: The marks in the West High School of Commerce admitting to the lowest third of the class range up to 76.4, those admitting to the middle third of the class range from 76.6 up to 79.7; marks above this point admit to the high third of the class. At the opposite extreme of the upper part of the diagram is Lincoln. Here marks admitting to the lowest third of the class range up to 81.2, those admitting to the middle third of the class range from 82.2 up to 87.2; marks above this point admit to the high third of the class.

TABLE 17.—VARIATION IN MARKING SYSTEMS OF DIFFERENT HIGH SCHOOLS

	February entry			September entry		
	High third per cent	Middle third per cent	Low third per cent	High third per cent	Middle third per cent	Low third per cent
Central	85.2 up	80.5–85.0	80.2 down	85.0 up	78.0–84.0	78.0 down
East	86.0 "	78.0–86.0	78.0 "	83.0 "	77.0–82.0	77.0 "
Glenville	88.3 "	81.3–88.0	81.0 "	86.3 "	79.5–85.5	78.8 "
Lincoln	91.2 "	86.7–90.5	85.5 "	87.7 "	82.2–87.2	81.2 "
South	87.0 "	81.0–87.0	80.0 "	86.0 "	80.0–86.0	79.0 "
West	88.0 "	83.0–88.0	82.0 "	87.5 "	79.0–87.0	78.0 "
East Technical	82.0 "	75.0–81.6	75.0 "	81.0 "	75.0–80.0	75.0 "
West Commerce	80.4 "	75.2–80.2	74.2 "	80.2 "	76.6–79.7	76.4 "
East Commerce	84.0 "	80.0–83.0	79.0 "	84.0 "	81.0–83.0	80.0 "

The grading systems of the different high schools as here exhibited can be explained in some measure by

the facts which have been discussed in earlier paragraphs. In general, those schools which receive high-rank pupils from the elementary school, as shown in Diagram 46, have a very high mark as the lower boundary of the highest third of their own first-year classes. Correspondingly, those schools which admit from the elementary schools many students of low rank tend to reflect the fact in the low percentage mark which admits to the highest third of their own classes. While this explanation holds in a general way, it breaks down when one attempts to apply it in detail, especially when one considers the thirds other than the highest. Thus West and Lincoln, which are almost alike in the character of the pupils received, are different in the lower thirds. West Commercial, which stands in the middle of Diagram 46, is at the extreme in Diagram 49. Central and South have reversed their relations and East has moved entirely out of its original position shown in Diagram 46.

It may be well to call attention to the way in which these diversities in the marking system bear upon one of the regulations of the city schools. Students who receive the grade of 85 or more are admitted to the City Normal School without examination. Under this rule a student would have to be well up in the highest third of the class in West Commercial and East Technical in order to qualify. At Central the student could qualify from the foot of the highest third, while at Lincoln students from the foot of the middle third would be accepted under the rule.

Number of Repeaters, Students Dropped, and Failures

These details show that the grading systems of the various schools are sufficiently different to require further investigation. In order to make this investigation, reports were secured from the Department of Statistics showing for each high school the following facts: (a) the total number of students registered in each subject, such as first-year English, first-year mathematics, etc.; (b) the number of students registered in each subject as repeaters, that is, taking the course a second time; (c) the number of students who dropped the course for any cause whatsoever during the semester; and (d) the number of failures.

Reports were worked up for two periods, namely, January, 1914, and June, 1914. At each of these periods the full statistics were given for two classes of students—those who entered school in September and those who entered in the middle of the year. The January report described students who entered in September, 1913, as first-term students. Those who entered at midyear, 1913, were described as second-term students. In the June report the students who entered in September, 1913, had become second-term students, and a new class entering at midyear were now described as first-term students. There are accordingly three groups of students to be dealt with in these reports, the first-term students in the January report being the same as the second-term students in the June report, while the second-term students in the January report and the first-term

students in the June report are different classes separated by a full year in the dates of their entrance. Diagram 50 shows the relation of these classes.

Comparisons of Four Schools

Diagrams 51 and 52 are an effort to present in graphic form the somewhat intricate facts given in the reports

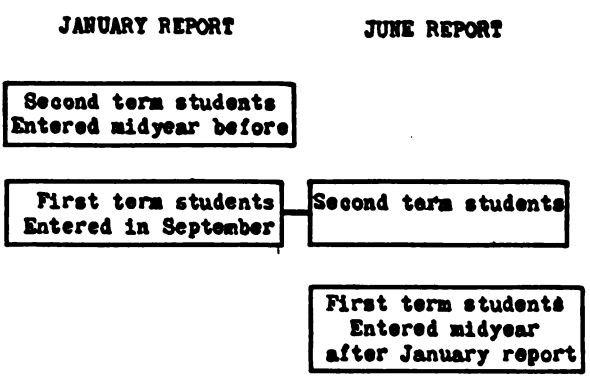


Diagram 50.—Identity of students classified as "second term" and "first term" in the January and June reports

above described. Four high schools were selected for these diagrams because they show in a very striking way four wholly different types of organization of first-year classes in English and mathematics. Following the upper series of lines in Diagram 51 from left to right, the interpretation is as follows: In Lincoln High there were in January, 1914, four per cent of the second-term class in first-year English

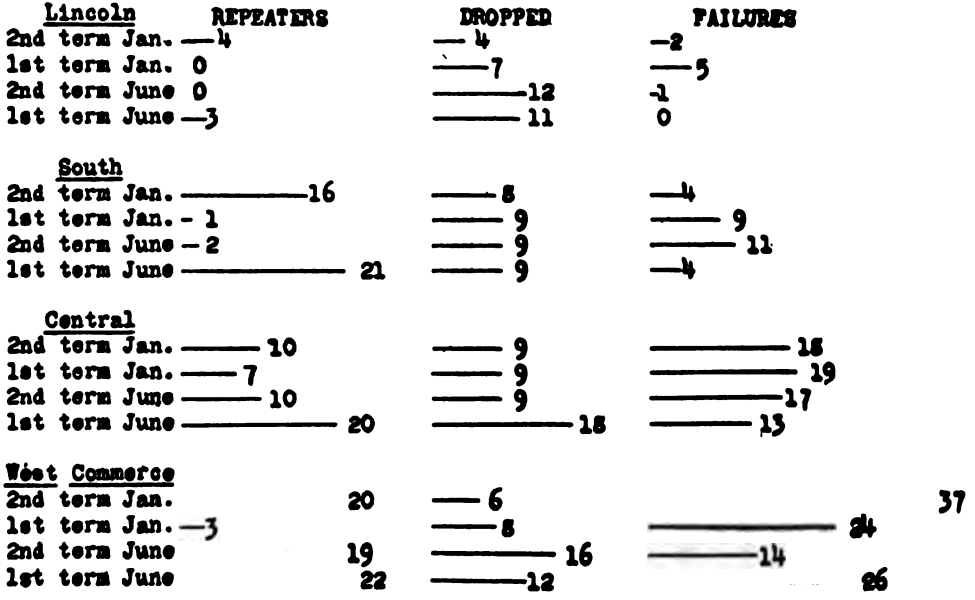


Diagram 51.—Per cent of pupils in the first year classes in English in four high schools who were repeaters, dropped from the course, or failed, as reported in January and June, 1914

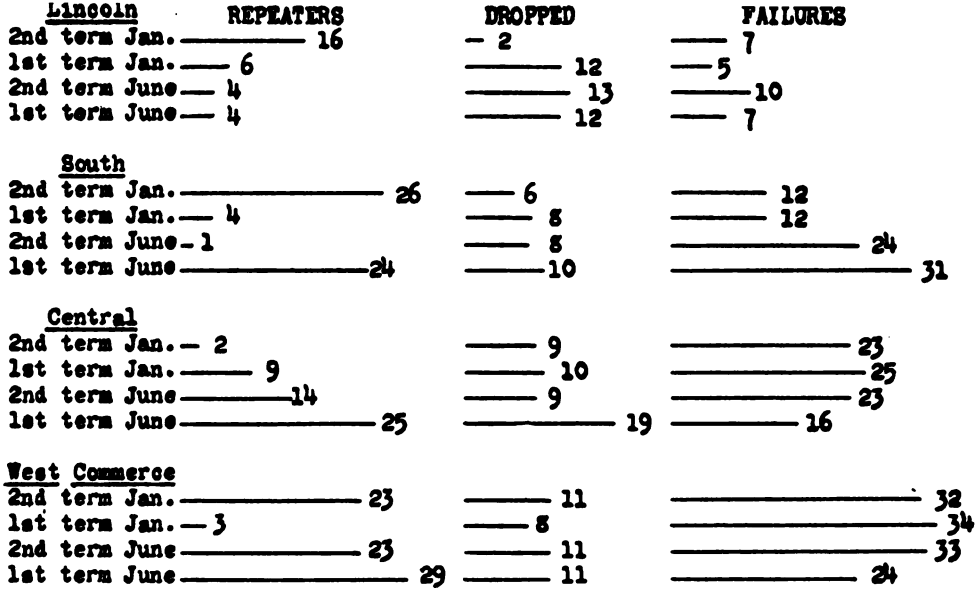

Lincoln
REPEATERS
DROPPED
FAILURES
2nd term Jan. 16 2 7
1st term Jan. 6 12 5
2nd term June 4 13 10
1st term June 4 12 7
South
2nd term Jan. 26 6 12
1st term Jan. 4 8 12
2nd term June 1 8 24
1st term June 24 10 31
Central
2nd term Jan. 2 9 23
1st term Jan. 9 10 25
2nd term June 14 9 23
1st term June 25 19 16
West Commerce
2nd term Jan. 23 11 32
1st term Jan. 3 8 34
2nd term June 23 11 33
1st term June 29 11 24

Diagram 52.—Per cent of pupils in the first year courses in mathematics in four high schools who were repeaters, dropped from the course, or failed, as reported in January and June, 1914

who had taken the course before. They are represented by the short horizontal line which is four units in length. Just below this line is the record "0," which means that there were no students repeating the first-term course. Two further records are entered immediately under the two taken from the January record. The two lower entries are from the June record. The third record from the top of the diagram is a second "0" and means that there are no pupils in that class repeating. Let it be borne in mind that the two middle records (both "0" in this case) refer to the same class. Finally, the new first-term class is reported in the fourth entry from the top of the figure. This class includes three per cent repeaters.

Evidently repeaters tend to accumulate in the midyear classes. This fact is readily understood in view of the general tradition of the schools that regular work normally begins in September. The persistently irregular character of the midyear class shows how difficult it is to overcome the traditional September to June school year.

Following the diagram horizontally across the top, we next come to the record of students who dropped out of first-year English in the Lincoln High School. In January four per cent of the second-term students had dropped and seven per cent of the first-term students. In June, 12 per cent more were added to the seven recorded above, thus reducing the class that entered in September by two withdrawals of

seven and 12 per cent, respectively. Finally, in June, 11 per cent of the students who began English at midyear had gone.

The third part of the diagram at the right of the upper line records failures. The percentages here reported are calculated on the base of students left in the class after withdrawals are taken out. Thus, in January, two per cent of those who had been studying English for a year failed and five per cent of those who had been studying for half a year. In June, one per cent failed from the class that lost five per cent in January, and zero per cent failed in the new class that had been studying English for half a year.

With this explanation of the diagram it is possible to note several major facts. First, with reference to the number of failures, the four schools show the most striking differences. Lincoln fails an insignificant percentage; while at the other extreme West Commercial fails students in surprisingly large numbers. Second, in respect to repeaters, the schools differ radically. One hardly sees where all the repeaters in South come from. Evidently there is a general tendency to put them into the same classes with midyear students. Third, the diversity in the four schools with regard to failures and repeaters is not paralleled by any striking differences in the number of withdrawals. In this matter students seem to follow much the same tendencies in all the schools. The two strikingly large records of pupils dropped, namely, 18 per cent from the Central School and 16 per cent from West Commerce, may possibly have some con-

nection with the parallel record of repeaters in each of these classes. Where there are many repeaters, the probability of discouragement and withdrawal is increased.

Diagram 52 shows the records of the four schools in first year mathematics. The characteristics of each school as shown in the English records reappear in this diagram. Furthermore, it appears, when mathematics and English are compared, that students in all the schools find mathematics a more serious stumbling-block than English.

Comparisons of Academic, Technical, and Commercial Schools

Diagrams 53, 54, and 55, drawn on the same pattern as the diagrams discussed above, show the combined reports for each type of school. The commercial schools show the heaviest score of failures in English, but give place to the technical schools in some of the mathematics records.

These diagrams show that there are radical differences in the three types of high schools. These differences are in part explained by differences in the character of the student body. In part, however, the facts here reported do not parallel those presented in the earlier paragraphs of this chapter, where differences between the students in the various schools were discussed. Furthermore, it is shown by the records of repeaters that the organization of classes is different. These facts are all the more impressive

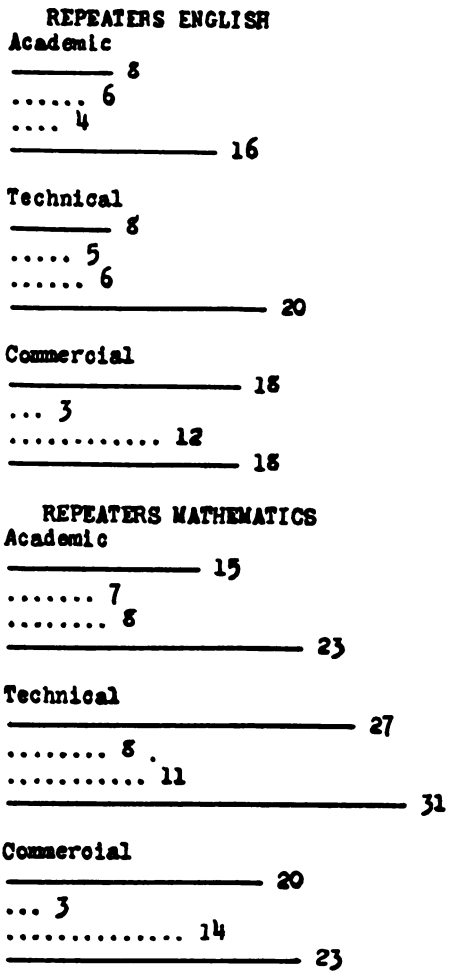


Diagram 53.—Per cent of pupils in the first year courses in English and in mathematics in the three kinds of high schools who were repeaters, as reported in January and June, 1914

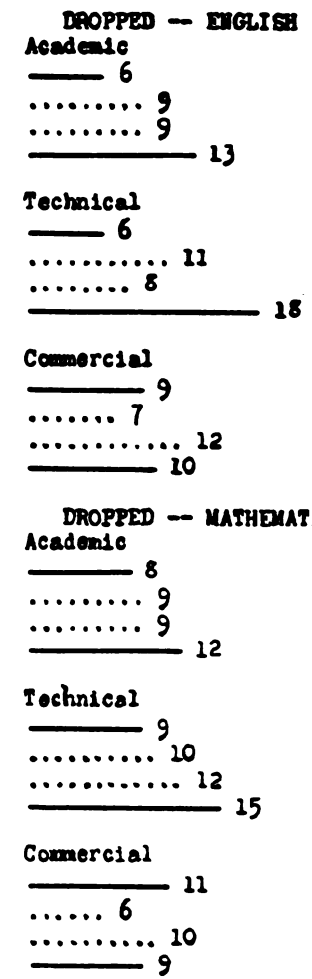


Diagram 54.—Per cent of pupils in the first year courses English and in mathematics in the three kinds of high schoo who were dropped, as reported in January and June, 1914

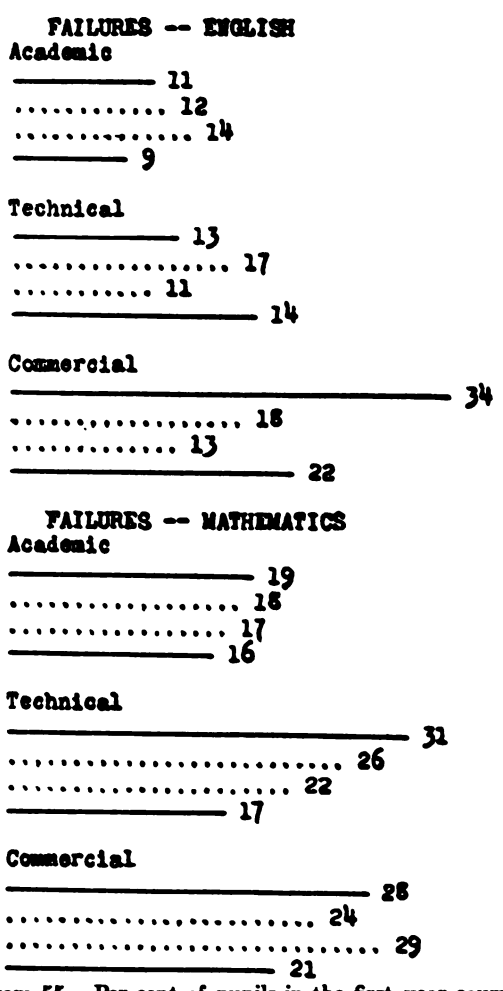


Diagram 55.—Per cent of pupils in the first year courses in English and in mathematics in the three kinds of high schools who failed, as reported in January and June, 1914

when it is remembered that the two subjects discussed up to this point, namely, first-year English and mathematics, are required of every student in all the high schools. What does it mean for the city school system that West Commercial fails in a required class 37 per cent of the students? What does it mean when the corresponding class in Lincoln fails only two per cent? Is it conceivable that these two schools are both conducting the same type of work or serving the community equally well?

Comparisons Between Successive Years

Another type of comparison between records of courses is presented in Diagrams 56, 57, and 58, where failures in the three successive years of English are shown. The natural expectation would be that students who show sufficient ability to complete first-year English ought to go on without serious setback. In West Technical and West Commercial this expectation is met by an appreciable reduction from year to year in the percentage of failures. On the other hand, in South and somewhat less consistently in Glenville, the number of failures increases in the later years. It must be that schools have a different attitude toward advanced courses in English. If we turn to Diagrams 59 and 60, we find a different showing with regard to the two mathematics courses which are required of all students, namely, Mathematics D and C. Here we find that West Technical, which in the case of English failed fewer pupils in the second

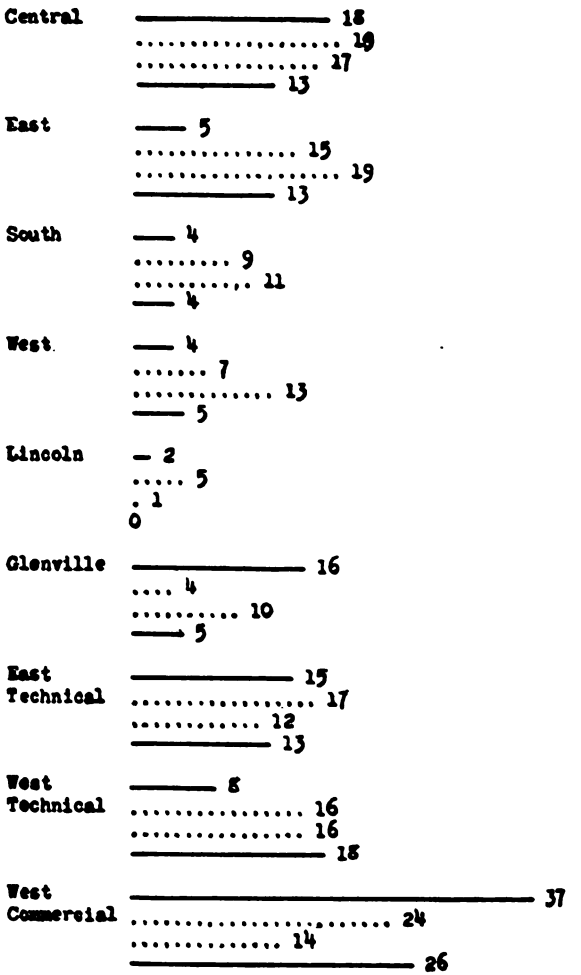


Diagram 56.—Per cent of pupils in the first year courses in English in nine high schools who failed, as reported in January and June, 1914

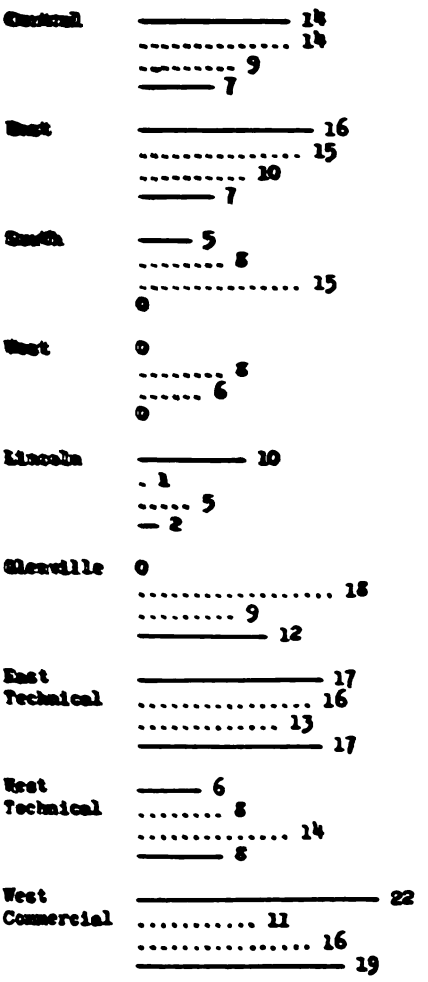


Diagram 57.—Per cent of pupils in the second year courses i English in nine high schools who failed, as reported in Januar and June, 1914

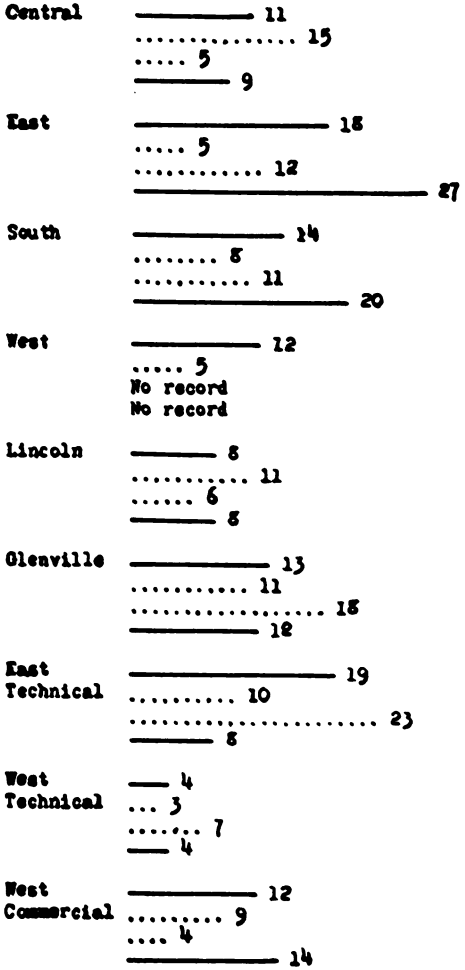


Diagram 58.—Per cent of pupils in the third year courses in English in nine high schools who failed, as reported in January and June, 1914

year, fails an appreciably larger percentage of students in second-year mathematics. On the other hand, we find that in Central the tendency in both English and mathematics is the same. Second-year students in both of these subjects in Central fail in smaller numbers than first-year students. The balance between mathematics and English in West Technical and Central must be very different. The explanation which immediately suggests itself is that very rigorous mathematical courses are thought to be necessary for technical students, while in the Central High School, where a general education is sought by many of the students, mathematics is treated less rigorously. In English, on the other hand, the department of West Technical seems to have a different policy from that of East Technical. It is interesting to note that in Lincoln, where the number of failures in the first-year course is very small in both subjects, there is a marked tendency to increase the number of failures in both English and mathematics in the second year. This shows a policy different from that at Central or West Technical. The question arises whether the leniency which was shown at Lincoln in the first year was well advised.

No attempt has been made up to this point to determine the wisdom of the various policies that have been discovered. How large a percentage of students an instructor has a right to fail is a matter on which there probably would be no general agreement. In a public high school, which students are urged to enter by elementary school teachers and

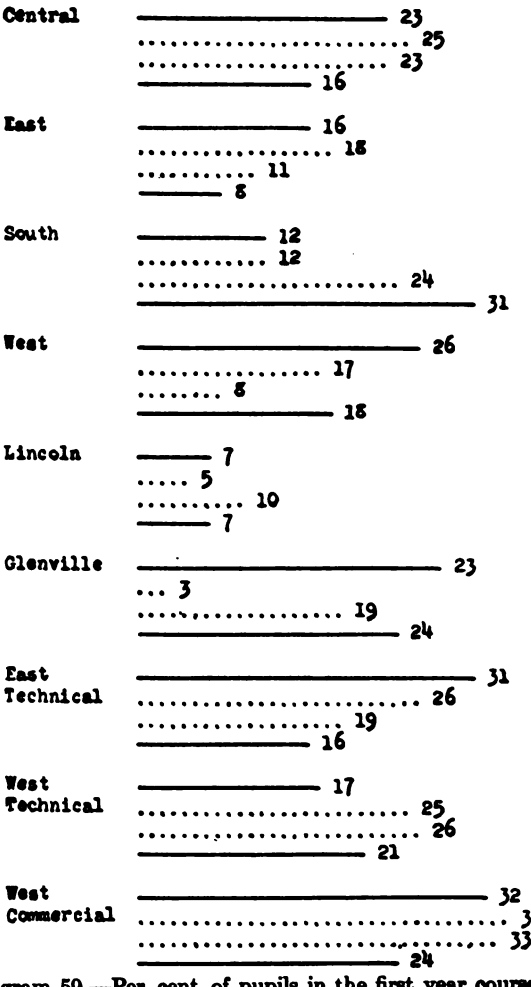


Diagram 59.—Per cent of pupils in the first year courses in mathematics in nine high schools who failed, as reported in January and June, 1914

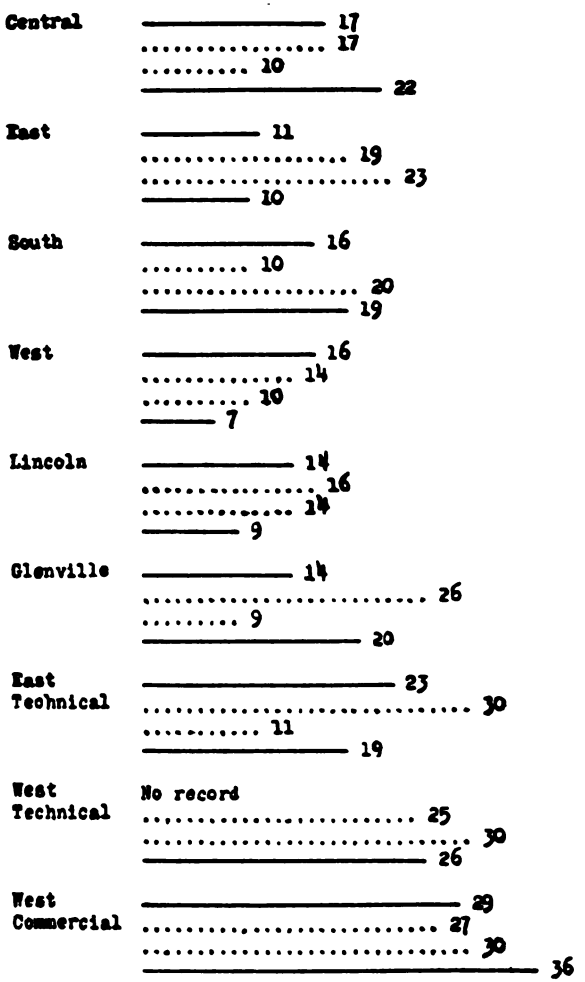


Diagram 60.—Per cent of pupils in the second year courses in mathematics in nine high schools who failed, as reported in January and June, 1914

by the growing sentiment of the community, it seems very doubtful whether as large a percentage of any class ought to fail as is indicated in a number of cases in these tables.

Nor can the explanation be offered that the students are immature or that their elementary work was poorly done. It is the duty of the school system to see that elementary courses lead into the high school without any such serious danger of a setback as is exhibited in some of these records of failure. It is contrary to good public policy that there should be the wastage represented in some of these records.

Failures in Non-required Subjects

In order to make a comparison between the policies of different schools with regard to subjects other than English and mathematics, Table 18 has been prepared. In this table all the larger classes in the larger high schools are represented, and full statements are given of all the failures reported in January and June, 1914. As in the diagrams given above, the January and June reports are so arranged that the uppermost figure in each division of the table represents the class which entered in February, 1913. The second figure from the top in each division of the table represents the class that entered in September; the third figure refers to the June report of the class that entered in September, and the fourth figure represents the class that entered in February, 1914. In some cases only one figure appears in a division of the

TABLE 18.—NUMBER OF PUPILS FAILING IN EACH SUBJECT IN NINE HIGH SCHOOLS IN JANUARY AND JUNE, 1914

School	Latin D	German D	Latin C	German C	Applied arts D	American history	Physics	Chemistry	Industrial geography D	Botany and physiology
Central	42	7	26	15	3	7	10	8	..	..
	30	20	15	20	4	6	12	4	..	11
	29	5	7	6	4	..	6	4	..	..
	32	30	26	8	..	..	8	13	..	2
East	30	26	9	12	6	4	28	5	..	14
	33	23	22	13	6	..	23	..	..	..
	36	23	15	20	2	..	9	13	..	..
	34	23	24	28	..	..	23	9	..	17
North	15	4	21	23	..	..	4	4	..	5
	15	24	16	12	6	..	7	20	..	11
	26	4	26	3	5	..	7	5	..	..
West	17	22	13	5	..	7	..	..	..	4
	20	28	5	26	..	..	4	..	..	..
	23	24	16	9	12	..	..	1	..	..
	22	20	9	18	..	..	..	..	..	..
Lincoln	34	26	20	6	2	20	..	13	..	..
	25	25	13	4	..	..	9	..	..	..
	24	23	6	..	9	17	12	12	..	..
	21	24	22	2	..	..	4	5	..	..
Glenville	31	21	31	..	..	..	3	10	..	..
	25	25	24	27	4	..	15	..	..	..
	22	23	11	9	..	..	4	2	..	2
	26	21	24	20	..	..	12	20	..	5
East Technical	..	..	..	..	2	28	15	7	20	10
	..	..	..	..	21	..	16	15	15	15
	..	..	..	..	6	..	17	12	14	12
	..	..	..	..	..	..	16	15	19	13
West Technical	..	..	..	..	4	9	..	20	22	..
	..	..	..	..	5	12	28	30	15	4
	..	..	..	..	5	..	8	25	22	2
	..	..	..	..	20	..	14	19	20	3
West Commerce	..	..	..	..	7	26	..	3	..	17
	..	..	..	..	11	19	2	11	..	12
	..	..	..	..	3	2	..	..	..	18
	..	..	..	..	6	16	3	5	..	14

table. This indicates that only one class in the subject is given.

A number of characteristics of the different schools are shown by this table. In the first place, it will be noted that the number of failures in Latin in the academic schools is very high indeed. More failures are recorded in many of the Latin classes of the academic high schools than are reported even in required mathematics. In these same schools the number of failures recorded in German D is much smaller. German is the subject which is commonly taken by students in the scientific courses. It was shown in Diagram 48 that the withdrawals and the non-promotions in the scientific course are more numerous than withdrawals and non-promotions in the classical course. The facts with regard to non-promotions and withdrawals would seem to indicate that, on the whole, the scientific students are not of so high a grade as the classical students; and yet we find that the subject most commonly elected by the scientific students is the one in which failures are by no means as common as in Latin, which must be taken by all the classical students. This is perhaps the most striking example yet encountered of the general probability that failures in a given course do not depend altogether upon the deficiencies of students. It would seem that the standards set up in Latin as contrasted with those set up in German are artificially high or else the standards in German are too low. There is, of course, the further possibility that German is very much easier to teach than Latin. It

would require more evidence than is at hand, however, to prove such a statement as that.

The contrast between Latin and German is made even more impressive if we note the facts with regard to the second-year courses in these subjects. In a number of the schools, especially in Lincoln and Glenville, we find that the second year of German is very much less rigorous than either the first year of German or the second year of Latin. The contrast for the other four academic schools is somewhat less striking.

Another impressive fact which can be seen from the table appears when we examine in detail the reports of a number of subjects required in one school and elective in others. Thus, take the striking case of Applied Arts D. This course is required of the girls in the technical and commercial schools, but is an elective in the academic schools. There is in the academic schools a very fair registration in the course so that a comparison is entirely legitimate, and yet it will be seen that the percentage of failures in applied arts in the academic schools is very small indeed. In many cases there are no failures reported for the class. In West Technical and West Commercial, on the other hand, the number of failures in this course is relatively large. The contrast between West Technical and East Technical is of some interest in this connection, since East Technical does not, on the whole, have so many failures as West Technical.

Turning to an academic subject, we note that American history is for the commercial high school a

requirement, while for the other high schools it is an elective. Undoubtedly the students who go into an elective course are more interested in doing the work of the course, and consequently less likely to fail, but, even with this allowance for a difference in the attitude of the students, it would appear that the work in American history in the commercial high school must be of a very different type from that offered in other schools to justify the high percentage of failures.

The same general type of discussion may be continued by referring to the examples of physics and chemistry. Here the technical schools stand out as the schools in which a large number of failures occur. Physics and chemistry are taken by the technical students as an essential part of their general course. The registration in other schools is large, but is elective. Certain interesting contrasts appear in detail as between chemistry and physics. If, for example, the chemistry course in East High School is contrasted with the physics course, it would appear that physics is the much more difficult, while in West Commercial the reverse is distinctly evidenced.

An impressive comparison between the two technical schools is made possible by the reports in industrial geography and botany and physiology. Industrial geography is a subject required of the boys; botany and physiology are required of the girls. In the East Technical High School the rigor of these two courses is about the same, while in West Technical there is a marked difference.

Other equally striking contrasts can be exhibited

in other subjects. The results thus far exhibited may therefore be described as typical. The meaning of all the facts is perfectly clear. The policies of different schools and of the different departments in each school vary so much that a definition of these policies may very justly be asked for by the public. When a boy goes to the technical schools not only does he elect a type of course which is different in general, but this course is very different in its details from that offered in other high schools of the city. Even in the subjects which are required in all high schools, such as English and mathematics, the boy in the technical high school finds that he is in a course very different from that which he would be pursuing if he took exactly the same subject in some other high school.

Registration in the Different Schools

The result of all these various policies is seen in the unsymmetrical development of the high schools. The academic high schools have failed to develop notably in numbers. The commercial school has lost some of its boys and has increased very little in the number of girls. The technical schools have grown enormously. The figures for the last three years are given in Table 19.

That the number of boys in the commercial high school is relatively small is explained by the fact that the course of study lays great emphasis on subjects which give training for minor clerical positions. There is a broad view of commercial education which

emphasizes matters very different from typewriting and stenography. This view conceives of commerce as a general social and scientific problem. Such a broad view, if adopted, would lead to a course of study containing much general economics and science now lacking in the Cleveland High School of Commerce. Such a comprehensive course would undoubtedly be more attractive to boys than is the present course. Furthermore, some of the academic work in the commercial school suffers because the demand is not made that students prepare work. The long school day seems to have established the tradition that all preparation is to be made during school hours. This contributes to a low standard in many of the academic courses given in the Commercial school, which is not promising for the development of the school.

TABLE 19.—ENROLLMENT OF PUPILS IN ALL HIGH SCHOOLS IN THE FIRST SEMESTERS OF THREE SUCCESSIVE YEARS

	1912–13	1913–14	1914–15
Boys			
Academic	2,254	2,189	2,213
Commercial	288	261	257
Technical	1,278	1,396	1,706
Total	3,820	3,846	4,176
Girls			
Academic	2,369	2,593	2,564
Commercial	463	522	558
Technical	496	623	880
Total	3,599	3,738	4,002
Grand total	7,419	7,584	8,178

With regard to the courses in the technical schools, it should be noted that they do not train for workmen's positions. These schools train very few boys who go into the trades. As a solution of the problem of industrial training, these schools contribute very little to Cleveland's problems. The demand for industrial training of the common people will have to be dealt with in some other fashion.

The failure of the academic schools to grow is a grave symptom. The device adopted of organizing a course which is thought of as inferior to the classical and scientific courses is probably as disastrous a measure as could be proposed. Standards throughout the school will suffer, and the students in the inferior courses will not be respected nor will they respect themselves. Cheap courses are not what are needed, but richer courses.

Junior High Schools

The motives for the establishment of junior high schools were set forth in the last report of the Superintendent and need not be reviewed here. With the opening of schools in 1915 three such schools were organized. Evidently it is too early to report the results of these experiments. At the same time, certain problems have arisen which are of such general importance as matters of school policy that they deserve comment.

First, each school has two principals, one a man and the other a woman. In a general way, the func-

tions of these officers are described by saying that the man is to have charge of the boys and the woman of the girls. It appears that neither one has responsibility over the course of study. The man makes the program and has supervision over certain types of work. Other subjects and teachers are assigned to the woman.

This organization appears to be clumsy and expensive and to fail at the point where greatest supervisory activity is needed, namely, in arranging the details of the course of study.

The course of study needs very careful supervision. It appears that the introduction of Latin into the seventh grade was contrary to the judgment of at least one principal and one assistant superintendent. It was introduced because of the insistence of one of the members of the Board of Education. There is promise of disaster in such procedure.

The administration of the course of study is a very delicate and important part of this experiment. The Board of Education can hardly have the experience or judgment possessed by educational officers in direct charge of classes. Furthermore, it is impossible for any system to get satisfactory results if the Board of Education tries to dictate the course of study.

The adaptation of the new material which is being put into these courses to the needs of younger pupils is a matter of the highest importance. Thus, when algebra or science is carried down into the seventh and eighth grades, these subjects must be worked

over and fitted to the capacity of the pupils. This requires the greatest freedom on the part of teachers and flexibility of material. Furthermore, the teachers must be competent to make the adjustments, and they must be supplied with the apparatus and with the opportunities of study which comport with the new task given them. At present the teachers do not select their textbooks. They are limited in training. They are trying, in some cases, to carry high school work into the lower grades without modification. The conditions do not seem promising in these respects for success.

It appears that the relation of the junior high schools to the high schools has not been worked out. Are students from these schools to be admitted into both technical and academic schools with equal freedom? Is the ninth grade, when organized, to have a course of cosmopolitan or of academic type? That these problems have not been solved is a misfortune, because it keeps all the members of the staff, as well as the pupils, in doubt as to the advantages and outlook of the work.

These problems call for strong and co-operative administrative action. The high schools and elementary schools should find in the organization of junior high schools an opportunity for united study of the possibilities of closer co-ordination of all schools. There are, in these new schools, possibilities of economy of time and of stimulating instruction of pupils who heretofore have not had the kind of work adapted to their powers. The experiment

should be one of the most important that the system has undertaken in recent years.

The most important fact in the whole situation is that the organization of junior high schools in Cleveland is an experiment. Experiments cannot be successfully worked out through the method of absent treatment. Only the workers who are meeting the new problems from day to day can successfully make the multiple readjustments that are essential for success. In Cleveland this condition does not maintain. Responsibility for the new schools is placed on the shoulders of the principals, and power to develop the details of the experiment is retained by the Board of Education at headquarters.

The teachers and principals are charged with the duty of developing an entirely new type of educational work. Nevertheless the Board of Education decides what shall go into the course of study in different grades and what shall be kept out. It decides what books shall be used and which teachers shall be assigned to the work. Good results cannot be secured through a scattering of power and responsibility. The teachers, principals, and superintendents are charged with the duty of working the new experiment out to a successful conclusion. They should be given the power to take the steps necessary to attain this end.

Cosmopolitan High Schools

Any discussion of the high schools of Cleveland must take into account the history of the system and the strong partizan sympathies which have grown up, especially in recent years. There are in the system many teachers who never think of advising a bright pupil to go to any except an academic school. Western Reserve University receives only graduates of the academic schools. On the other hand, there is evidently a great popular admiration for the technical schools. Many families which would not think of sending their children to the academic schools willingly sacrifice to secure a technical or commercial-school training for their children. Principals and teachers of the non-academic schools recall the old days when commercial students were looked down upon in the mixed school and tell of the present-day contentment of commercial students who work together in an atmosphere of separateness and devotion to the practical arts.

The spirit of all considerations of the high schools seems to be the spirit of competitions, criticisms, and counter-criticisms. If one suggests the desirability of the cosmopolitan type of high school, he is told that Cleveland tried it once and it failed. He is reminded of the success of the technical school. He is told that special types of instruction require special types of administrators and teachers.

There are three statements that can be set over against such remarks. First, Cleveland has in her technical schools today cosmopolitan schools. There

is no Latin in these schools, but every other type of work is given. Furthermore, the new English course in the academic schools is an experiment in the direction of cosmopolitan organization prompted by the desire to stem the tide of migration to these cosmopolitan technical schools. Second, the cosmopolitan type of high school flourishes in other cities. Cincinnati and St. Louis are impressive examples for Cleveland to consider. If the experiment of years ago in enriching the course of study failed in Cleveland, possibly the reason is to be sought in the failure to be cosmopolitan enough. Third, whatever the virtues of the present system in Cleveland, competition, rivalry, and lack of organization are so evident that steps must be taken toward closer co-operation and greater uniformity of opportunity for all students.

Perhaps it is wise to abandon all controversial terms. There would doubtless be unanimity in favor of the proposal that the course of study be enlarged in all schools. The academic schools have begun to offer courses in the domestic subjects for girls. There should be a broader view of vocational opportunities for the boys. In the technical schools there are many boys and girls who have realized the value of a higher education. The road ought to be open from these schools to any college.

With this richer course of study should come rational standards wisely administered so that no course and no group of students shall shrink into seclusion in order to cultivate self-respect. A commercial course can be made thoroughly respectable

in a school that teaches Latin or even Greek. Until the commercial course is respectable in all companies it is not likely to be respectable in any company. Cleveland would profit in the long run by a type of organization which calls for equal standards for all subjects. At the present time there does not seem to be standardization of work in the disjointed, competing schools.

There is no argument against the establishment of cosmopolitan high schools more commonly made, or more generally accepted, than that technical and commercial courses cannot be made to succeed under the direction of the principals and teachers of academic high schools. The fact of the matter is, however, that in Cleveland, as in other cities, cosmopolitan high school courses are triumphantly succeeding in schools which were initiated as technical high schools and subsequently developed into cosmopolitan schools.

The lesson of this is that the two types of high school work are mutually compatible and that the principals and teachers exist who are entirely capable of successfully administering them. Such leaders must be found, however, if the cosmopolitan courses are to be successful, and this is an indispensable prerequisite to the establishment of cosmopolitan courses in Cleveland where academic traditions have been so long established and are so deeply entrenched. Cleveland faces the alternatives of securing leadership of this capable type or of continuing the present destructive competition in its high schools.

Besides the arguments already stated against the continuation of a system of specialized high schools, and in favor of the gradual development of a system of cosmopolitan high schools, there remains one more important consideration. Cleveland at present has no comprehensive policy for the support and extension of its high school system. It has at the present time two technical high schools, one commercial high school, and seven academic high schools. Before long the city will be forced to open a new high school. Even if it succeeds in filling all the vacant seats in its present academic high schools, it will have to face the problem of opening new high schools within a few years.

If the city is to proceed on the policy of having specialized high schools, it must decide what type of school to open next. Already there is a considerable sentiment in favor of having the next high school an agricultural one, and a lesser amount of public support for the establishment of a high school of music and a high school of art. If these newer movements gain headway, the city will be confronted by the need for a new high school and by the conflicting claims of groups of sincere citizens advocating the establishment of a new academic, or technical, or commercial, or agricultural, or music, or art, high school, as the case may be.

High schools in Cleveland, as in other cities, are largely local in their radius of influence. Every school gets a considerable portion of its students from homes situated near the school. If the city consis-

tently follows a policy of establishing specialized high schools, it is entirely certain that a large number of its young people will receive specialized educations, the nature of which will be determined, not by considerations of individual tastes and abilities, but rather by considerations of the locations of the pupils' homes. This is not sound educational policy.

Cleveland ought not to establish a system of high school education which denies to a large part of the children valuable educational opportunities, because it groups opportunities of one sort in one school, those of another sort in another school, and those of a third sort in a third school, and so on.

For these same reasons the project of erecting a new commercial high school should receive careful and mature deliberation before it is converted into terms of stone and mortar, established courses, settled policy, and bonded indebtedness. At the present time all the money that can be secured for the building fund is inadequate to supply school accommodations for the children of the elementary grades. At the same time there are hundreds of vacant seats in the academic high schools. In view of these conditions, the city ought to be very certain that it wishes to embark on a settled policy of maintaining specialized high schools before issuing bonds for the erection of the projected new commercial building.

Recommendations

Central supervision of the high schools should be reinforced in some radical way. Some plan of equal-

ising and raising standards of instruction should be devised. Conferences between departments would be a first step. Inspection of departments would be a second, and reorganization of departments a third step which could be taken if necessary.

Commercial courses and technical courses should be made available in the academic high schools.

Detailed reports on the new English course should be required of every school. These reports should set forth the quality of students registering, the standing of such students, especially in courses where they mix with other students, and the length of the school attendance of such students.

It is recommended that the project of building a new commercial high school be given careful and thorough reconsideration.

Summary

This chapter deals with the high schools. It opens with a general statement of the problems which arise because of the policy adopted in Cleveland of separating the technical schools from the academic schools. It then sets forth facts showing:

1. That the students entering the different types of high schools are very different in the ranks which they received in the elementary schools, in their ages, and in their ability to hold their places in school.

2. That the marking systems in the various schools are in a measure affected by the quality of students entering, but in a larger measure by special policies in the individual schools.

4. The failures and causes of repeaters in the various schools contribute further evidence that there is the widest divergence in standards.

5. The reports on enrollment show that the system has not had a symmetrical and wholesome development.

6. The reasons for favouring the enlargement of the course of study in all schools rather than the further divergement of technical and commercial courses from academic courses are reviewed.

7. Comments on the problems of the junior high school are added.

The recommendations which are suggested by these findings are all directed toward the establishment of standards and the development of richer courses. It is pointed out that these ends cannot be attained without more highly centralised control.

APPENDIX

SCALES AND TESTS USED IN MEASURING THE WORK OF THE SCHOOLS

HANDWRITING

LETTER FROM SUPERINTENDENT OF SCHOOLS ON HANDWRITING

May 10, 1915

To the Teachers and Principals:

During the week beginning May 10, it is desired to secure samples of handwriting from all the pupils of the 5th, 6th, 7th, and 8th grades of all the schools. These samples should be secured as follows:

Each teacher should write on the board in the front of the room the first three sentences of Lincoln's Gettysburg Speech. As preliminary preparation, the pupils should read and copy this until they are thoroughly familiar with it and practically know it by heart. For the final test, preparations should be made so that all of the pupils can begin to copy at a given signal. They should be allowed to write for precisely two minutes. The papers will be scored for both speed and quality.

Writing should be in ink and on ruled paper. Each paper should bear the name of the pupil, the name of the school, and the grade. The teacher should mark on each paper the number of letters written by the pupil in the two minutes. It is not likely that any of them will be able to copy the entire three sentences in the two minutes allowed. The following count of the letters will greatly aid in scoring the papers:

Fourscore 9 and 12 seven 17 years 22 ago 25 our 28 fathers 35 brought 42 forth 47 upon 51 this 55 continent 64 a 65 new 68 nation 74 conceived 83 in 85 liberty 92 and 95 dedicated 104 to 106 the 109 proposition 120 that 124 all

127 men 130 are 133 created 140 equal 145. Now 148 we 150 are 153 engaged 160 in 162 a 163 great 168 civil 173 war 176 testing 183 whether 190 that 194 nation 200 or 202 any 205 nation 211 so 213 conceived 222 and 225 so 227 dedicated 236 can 239 long 243 endure 249. We 251 are 254 met 257 on 259 a 260 great 265 battlefield 276 of 278 that 282 war 285.

The papers will be scored for quality on the forenoon of Saturday, May 15, at the East Technical High School. This work will begin promptly at 9:00 o'clock. The handwriting samples should be sent to that building on or before that time. The papers for each grade and for each school should be fastened together.

Each school is invited to send one volunteer to that building at that time to participate in the work. These volunteers will be instructed in scoring handwriting by means of the handwriting scale and will be given copies of the scale. The object of this is to familiarize the teachers of the city with the methods which are being used in judging the work of their pupils.

Very truly yours,

J. M. H. Frederick,
Superintendent of Schools.

Scoring the Samples

In accordance with the letter of the Superintendent, a meeting of the representatives of the different schools was called for the purpose of scoring the handwriting samples. In rating the quality of the specimens, the Ayres scale was used. This scale is published by the Russell Sage Foundation under the title "A Scale for Measuring the Quality of Handwriting of School Children." The pamphlet accompanying the scale gives full discussions of the methods by which the scale was made and directions for its use.

On examining the ratings of handwriting made by the representatives of the different schools, so much variability was found that it was decided not to use the results in the Survey report. Accordingly some 10,528 were selected at random and graded in the Survey office. The work was carried far enough to insure results typical of those in the system as a whole.

In tabulating the results, a card was used which scored the quality and speed at the same time, as is indicated in Diagrams 14 and 15.

SPELLING

Letters from Superintendent of Schools on Spelling

May 15, 1915

To the Principals:

By today's mail there is being sent to each principal an envelope containing sets of instructions for conducting tests in spelling. These tests are to be given in all the A and B grades from the second through the eighth. Enough sets of tests are being sent to supply all the teachers of these grades. These tests in spelling should be given on the morning of Monday, May 17, 1915, and the tabulation of the results completed that same day if possible and the sheets returned to the office of the Survey Committee, Room 25, 612 St. Clair Ave.

Sincerely yours,

J. M. H. Frederick,
Superintendent of Schools.

May 20, 1915

To the Principals:

A second set of spelling tests is being sent to each school for testing the spelling of the pupils in all the grades from the second through the eighth.

In the test given last Monday the spelling words for the East Side schools were arranged in lists and those for the West Side in sentences. In the coming test this is reversed and the lists for the East Side schools are given in sentences while those for the West Side are arranged in lists. It is hoped that by making this experiment we shall be able to secure most helpful information as to the relative values of the list and context spelling tests.

The returns from the first set of spelling tests are exceptionally satisfactory. They indicate that throughout the city the instructions have been carefully followed and the results faithfully recorded. If we can secure an equally good set of results in this second test, the two sets will furnish information which should be of great value to our schools in the future.

Please give the new tests if possible on Monday, May 24, and return the filled out record sheets to the Survey office immediately upon the completion of the work.

Sincerely yours,

J. M. H. Frederick,
Superintendent of Schools.

Words Used in Spelling Tests

The words for the spelling tests were selected from the lists in the Ayres spelling scale. This scale is published by the Russell Sage Foundation. It is comprised of the 1,000 commonest words in English writing so arranged as to show norms of spelling ability in all the grades from the second through the eighth. The data of the scale are computed from an aggregate of 1,400,000 spellings by children in 84 cities throughout the country.

Two series of tests were given by the Cleveland Survey. In one test the children of each grade spelled 20 isolated words, while in the other test they spelled 20 words arranged in sentences. The following pages show first the manner of administering the tests in list form and the words used for each grade, and second the form used for giving the tests in sentences and the actual sentences used in each grade.

Spelling—CLEVELAND FOUNDATION SURVEY—May, 1915

To the Teachers of the 2nd Grade:

Please give the following 20 words as a dictated spelling test without previous preparation. Upon completing the work, please record the results as indicated below and return this sheet to the principal.

Test Words	Number of Pupils Failing on Word	Number of Pupils Failing on	
nine	——	no word	——
face	——	one word	——
ride	——	two words	——
tree	——	three words	——
sick	——	four words	——
got	——	five words	——
north	——	six words	——
white	——	seven words	——
spent	——	eight words	——
foot	——	nine words	——
blow	——	ten words	——
block	——	eleven words	——
spring	——	twelve words	——
river	——	thirteen words	——
plant	——	fourteen words	——
cut	——	fifteen words	——
song	——	sixteen words	——
winter	——	seventeen words	——
stone	——	eighteen words	——
free	——	nineteen words	——
		twenty words	——

Total number of misspellings——

X is total number of misspellings. Y is 20 times number taking test. Z is Y less X. Per cent for class in test is Z divided by Y. Please find this and record here ——.

School.....Teacher.....No. Taking Test....Grade A or B....

Words of Spelling Tests Given as Lists

3rd grade	4th grade	5th grade	6th grade	7th grade	8th grade
catch	afraid	sometimes	often	issue	divide
black	uncle	declare	stopped	material	principal
warm	rather	engage	motion	suggest	testimony
unless	comfort	final	theater	mere	discussion
clothing	elect	terrible	improvement	senate	arrangement
began	aboard	surprise	century	receive	reference
able	jail	period	total	respectfully	evidence
gone	shed	addition	mention	agreement	organisation
suit	retire	employ	arrive	unfortunate	emergency
track	refuse	property	supply	majority	appreciate
watch	district	select	assist	elaborate	sincerely
dash	restrain	connection	difference	citizen	athletic
fell	royal	firm	examination	necessary	extreme
fight	objection	region	particular	divide	immediate
stop	pleasure	convict	affair	absence	convenience
walk	navy	private	neither	testimony	receipt
grant	population	command	local	celebration	preliminary
soap	proper	debate	marriage	discussion	decision
news	judge	crowd	further	folks	judgment
small	weather	factory	serious	arrangement	recommend

Spelling—CLEVELAND FOUNDATION SURVEY—May, 1915

To the Teachers of the 2nd Grade:

Please give the following sentences as a dictated spelling test without previous preparation. Upon completing the work, please record the results as indicated below and return this sheet to the principal. The 20 words that are printed in bold-faced type are the ones that constitute this spelling test.

He **went back** to the **end** of the **lake.**
I give a page each Sunday.
On **Monday I take away** the **paper.**
He will **find** it **soon.**
He may **fall** on his **feet yet.**
The **show came** to town.
He **put** it down.

No. of Pupils Failing on		No. of Pupils Failing on		No. of Pupils Failing on		No. of Pupils Failing on	
went	—	page	—	away	—	feet	—
back	—	each	—	paper	—	show	—
end	—	Sunday	—	find	—	came	—
lake	—	Monday	—	soon	—	yet	—
give	—	take	—	fall	—	put	—

Total number of misspellings ———

X is total number of misspellings. Y is 20 times number taking test. Z is Y less X. Per cent for class in test is Z divided by Y. Please find this and record here ——.

No. of Pupils Failing on		No. of Pupils Failing on		No. of Pupils Failing on		No. of Pupils Failing on	
no word	—	five words	—	ten words	—	fifteen words	—
one word	—	six words	—	eleven words	—	sixteen words	—
two words	—	seven words	—	twelve words	—	seventeen words	—
three words	—	eight words	—	thirteen words	—	eighteen words	—
four words	—	nine words	—	fourteen words	—	nineteen words	—
						twenty words	—

School.....Teacher.....No. Taking Test.....Grade A or B....

Third Grade

That **suit** of **black** **clothing** is **warm.**
The **news** will **stop** the **fight.**
Unless he is **able,** he will not **catch** it.
I **began** to **walk** on the **track.**
The **small** **watch** is **gone.**
He **fell** as he made a **dash** for the **soap.**
He will **grant** your wish.

Fourth Grade

The **judge** is **rather** **afraid** to **refuse** to **restrain** the **population.**
My **uncle** will **retire** from the **royal** **navy** at his **pleasure.**
The **jail** in the **district** was not made for **comfort.**
In bad **weather** it does not **shed** rain.
It is **proper** to go **aboard** the ship if there is no **objection.**
They will **elect** him.

Fifth Grade

He will **sometimes** **employ** a **crowd** in his **factory.**
The **debate** on **private** **property** will be a **terrible** **surprise.**
He may **engage** in stealing but the court will not **convict** him of it.
The **final** **command** should be given in a **firm** voice.
She will **select** a **period** for **addition.**
I **declare** that there is no **connection** between this **region** and the other.

Sixth Grade

This **local** **affair** makes no **particular** **difference** to me.
The **total** **improvement** during this **century** is great.
They **mention** the fact that he **often** **stopped** at the **theater**
The **motion** of the boat is **neither** more nor less **than** it **was.**
Marriage is a **serious** matter.
A **further** **examination** will **assist** greatly.
A **supply** of food will **arrive.**

Seventh Grade

In the **absence** of **testimony**, the **senate** will **respectfully suggest** an **agreement.**

An **elaborate discussion** is **necessary.**

The **unfortunate citizen** will **receive** news of the **arrangement.**

The **issue** will not **divide** the **majority.**

The home **folks** will enjoy the **celebration.**

This **material** is **mere** nonsense.

Eighth Grade

The **principal** of the school will **recommend** the **arrangement.**

Judgment followed the **discussion** of the **evidence** and **testimony.**

He will **divide** the **athletic organization** at his **convenience.**

I shall **sincerely appreciate** a **preliminary receipt.**

The **immediate** effect of his **decision** in the **emergency** was **extreme.**

The **reference** is good.

USE OF SPELLING SCORES

The words selected for the spelling tests were of such difficulty that children in other cities make on the average scores of 73 per cent in attempting to spell them. This average score of 73 per cent is based on the spelling of children in each grade who have completed one-half of the work of that grade. In Cleveland the tests were given near the end of the year when approximately one-half of the children in each grade from the second through the eighth had almost completed the entire work of the grade and so should be expected to spell better than they would have at the mid-point of the year's work.

In order to make allowance for this, it was necessary to find the percentage of correct spellings expected from children in the upper divisions of each grade at the end of the school year. According to the spelling scale, the expected score

among children in the lower division of the second grade at the end of the year is 73, and that for the lower division of the third grade, spelling the same words, is 88. Then the expected score for children in the upper division of the second grade will be a percentage corresponding to a point half way between the 73 per cent point and the 88 per cent point on the base line of a surface of normal frequency. Reference to a table giving the values of the normal probability integral shows that this point corresponds to 81.4 per cent.

The computation for the two divisions of the third grade is the same as for the second grade. In the case of the grades from the fourth to the eighth, the expected figure for the lower division is in each case 73, but that for the lower division of the next higher grade, if spelling the same words, is in each case 84. The mid-point between these two points on the normal probability base line falls at 78.9.

These computations give a table of spelling standards for the different grades and their divisions at the end of the year as follows, the spelling scale standards and the Cleveland results both being given:

TABLE 20.—SPELLING STANDARDS FOR GRADES AND DIVISIONS

Grade	Lower divisions	Upper divisions	Both divisions	Cleveland results
2	73	81.4	77	74
3	73	81.4	77	78
4	73	78.9	76	73
5	73	78.9	76	75
6	73	78.9	76	78
7	73	78.9	76	76
8	73	78.9	76	80
Total	73	79.6	76	76

LETTER FROM SUPERINTENDENT OF SCHOOLS ON ARITHMETIC

To the Principals: June 3, 1915

Today there are being sent to all of the schools packages containing sets of arithmetic tests. Since the reading tests were given in the A grades, the present arithmetic tests are to be given to the B grades only. Moreover, in order to reduce the labor involved, the tests are to be given in one B division only of each grade from the 3B through the 8B. They should be given in one 3B division, in one 4B division, in one 5B division; and so on. This means that in a school having all the grades, they should be given in six rooms.

In the package you will find a sufficient number of tests for use in these six B divisions. You will also find on the top of the bundle of tests a set of record sheets, a sample arithmetic test filled out so as to show the method used in scoring, and a set of answer sheets.

Since this test involves considerable work in scoring and since the tests are to be carried on in only a small proportion of the rooms in most schools, it will lighten the labor and improve the results if you will have teachers from other rooms assist those where the tests are going on in giving them and scoring the results.

The teacher giving the tests should have a watch with a second hand. Before the work is begun, the instructions on the last page of the score sheet should be carefully read. The teacher should go over the score sheet with the pupils before the work is begun so as to be sure that they understand just what they are to do in each section. The 3B divisions should not be required to attempt the operations in the last part of the test if they have not been taught them, but if there are members of the class who wish to attempt them, they may be allowed to do so.

It is important that the times allowed for each set should be strictly followed, but it is not important that the half-minute interval between sets should be accurately observed. More time for rest may be allowed if necessary to avoid fatigue on the part of the pupils and if they tire of the work the tests may be divided and given at two times. The pupils are less likely to become weary if they are allowed to stand between each two sets of tests.

It is probable that these tests will be the last of the subject tests to be given in connection with the survey work. When all of the tests are complete and the results scored, please return the six sets, together with the record sheets, to the Survey Committee, 612 St. Clair Avenue East.

Very truly yours, J. M. H. Frederick,
Superintendent of Schools.

The Cleveland Survey

Arithmetic Tests

JUNE, 1915

INDIVIDUAL SCORE SHEET

Name..... Age .....

Grade..... Date .....

School..... Teacher .....

SCORE IN NUMBER OF EXAMPLES RIGHT

Set A	Set B	Set C	Set D	Set E
Set F	Set G	Set H	Set I	Set J
Set K	Set L	Set M	Set N	Set O

Total Score in Points for Whole Test .....

INSTRUCTIONS FOR CHILDREN

1. Obey promptly all signals from the examiner, who will tell you when to begin working and when to stop.
2. Do all your work directly on this paper. Work steadily and rapidly, but do not hurry. Only the answers that are right will be counted.

SET A—Addition—

												Number	Value	Score
1	6	9	0	4	1	7	9	3	2	1	3	6			
2	6	5	1	2	3	7	6	0	4	5	8	9			
0	3	8	9	7	8	2	1	4	8	0	2	3			
7	2	1	9	6	0	5	6	7	9	5	7	1			
4	7	0	3	1	2	5	6	7	5	8	6	9			
6	9	8	5	4	9	8	0	2	1	3	5	0			
4	2	9	7	4	5	7	4	8	0	3	9	2			
3	2	3	8	0	2	1	9	6	0	4	1	8			
5	0	6	2	4	5	1	6	3	7	9	0	4			
7	4	3	1	8	9	0	2	3	4	8	6	5			

Total Number Right | | 1 | |

SET B—Subtraction—

											Number	Value	Score
9	7	11	8	12	1	9	13	4	12				
9	3	6	1	3	0	7	8	3	6				
8	11	12	5	10	6	11	15	10	12				
0	9	7	1	2	0	7	8	9	4				
2	7	13	3	10	1	6	15	4	8				
1	5	7	2	5	1	3	9	2	3				
4	10	13	10	9	5	8	17	6	11				
4	7	5	1	4	5	6	9	4	8				
5	12	15	5	16	7	8	16	9	11				
0	9	6	3	8	0	5	7	1	4				

Total Number Right | | 1 | |

SET C—Multiplication—

										Number	Value	Score
3	4	9	0	5	4	2	7	4	9			
2	7	8	2	6	1	9	6	0	5			
9	5	4	7	6	2	3	9	0	7			
1	2	8	0	5	1	3	6	5	4			
1	2	7	0	8	7	3	9	2	4			
6	8	7	6	3	1	8	9	0	3			
1	4	8	0	4	1	6	8	0	9			
5	4	9	3	5	4	2	8	7	3			
1	3	6	0	3	2	6	7	5	4			
7	4	8	0	9	2	3	9	5	6		1	

Total Number Right

SET D—Division—

										Number	Value	Score
3)9	4)32	6)36	2)0	7)28	9)9	3)21						
6)48	1)1	5)10	2)6	4)24	7)63	6)0						
8)32	1)8	5)30	8)72	1)0	9)36	1)7						
2)10	7)42	1)1	6)18	3)6	4)20	7)49						
1)3	2)8	6)6	3)27	8)64	1)2	4)16						
5)0	3)24	9)63	2)4	8)24	7)7	2)18						
6)42	3)0	7)21	4)4	3)15	9)81	7)0						
											1	

Total Number Right

SET E—Addition

								Number	Value	Score
5	2	9	2	6	1	4	9			
2	8	8	8	3	4	6	7			
2	8	0	5	4	2	5	1			
0	5	7	0	8	5	3	5			
4	1	6	6	8	4	4	3			
6	2	6	8	5	4	1	3			
7	7	2	5	9	0	4	7			
8	3	3	1	6	8	1	2			
5	4	9	3	3	5	8	9			
5	1	3	8	8	5	4	6			

Total Number Right 5

SET F—Subtraction

616	1248	1365	1092	716
456	709	618	472	344
1267	1335	707	816	1157
509	419	277	335	908
1355	908	519	1236	1344
616	258	324	908	818
1009	768	1269	615	854
269	295	772	527	286

Total Number Right 8

SET G—Multiplication—

2345	9735	8642	6789	2345
2	5	9	2	6
9735	2468	6789	3579	2468
9	3	6	3	7
5432	9876	8642	3579	9876
4	8	5	7	4
5432	3689	2457	9863	7542
8	5	6	4	7

Total Number Right 7

SET H—Fractions—

				Number	Value	Score
$\frac{3}{5}+\frac{1}{5}=$	$\frac{6}{9}-\frac{4}{9}=$	$\frac{4}{9}+\frac{1}{9}=$	$\frac{8}{9}-\frac{7}{9}=$			
$\frac{1}{9}+\frac{5}{9}=$	$\frac{3}{7}-\frac{1}{7}=$	$\frac{1}{7}+\frac{4}{7}=$	$\frac{6}{7}-\frac{2}{7}=$			
$\frac{2}{9}+\frac{4}{9}=$	$\frac{4}{5}-\frac{1}{5}=$	$\frac{5}{8}+\frac{1}{8}=$	$\frac{6}{9}-\frac{5}{9}=$			
$\frac{7}{9}+\frac{1}{9}=$	$\frac{5}{7}-\frac{2}{7}=$	$\frac{5}{9}+\frac{2}{9}=$	$\frac{8}{9}-\frac{1}{9}=$			
$\frac{1}{8}+\frac{3}{8}=$	$\frac{6}{8}-\frac{1}{8}=$	$\frac{2}{7}+\frac{1}{7}=$	$\frac{5}{9}-\frac{4}{9}=$			
$\frac{2}{9}+\frac{6}{9}=$	$\frac{4}{8}-\frac{3}{8}=$	$\frac{4}{7}+\frac{2}{7}=$	$\frac{7}{9}-\frac{5}{9}=$			
		Total Number Right			3	

SET I—Division—

				Number	Value	Score
$4\overline{)55424}$	$7\overline{)65982}$	$2\overline{)58748}$	$5\overline{)41780}$			
$9\overline{)98604}$	$6\overline{)57432}$	$3\overline{)82689}$	$6\overline{)83184}$			
$8\overline{)51496}$	$9\overline{)75933}$	$8\overline{)87856}$	$4\overline{)38968}$			
		Total Number Right			10	

SET J—Addition

														Number	Value	Score
7	9	4	7	2	9	6	7	7	8	9	4	3	2			
5	2	5	1	9	6	9	1	8	0	5	3	1	1			
4	4	8	9	4	2	6	5	5	7	3	7	7	6			
2	8	1	4	8	4	7	1	4	1	4	7	6	6			
6	2	4	3	5	7	0	4	1	8	6	0	9	1			
0	7	8	2	1	1	4	6	8	5	2	2	6	8			
5	5	5	8	5	3	3	5	2	1	3	9	3	6			
1	3	1	5	2	9	7	3	1	3	9	5	4	9			
8	6	3	2	4	2	1	3	3	7	2	6	5	7			
3	1	9	7	3	3	6	7	9	4	2	3	4	5			
2	4	6	7	6	8	0	6	8	9	8	4	2	2			
9	8	3	1	7	5	6	1	4	4	5	8	9	2			
9	8	5	9	6	5	6	7	5	4	6	8	9	4			
														Total Number Right	16	

SET K—Division—

21)441	32)672	23)483	51)1173
71)1562	42)882	32)992	61)1342
53)1166	22)462	21)1071	52)1092
51)1122	41)861	31)961	41)1681
61)1281	22)484	31)651	33)693

Total Number Right	15	

SET L—Multiplication—

8246 29	3597 73	5739 85	2648 46	9537 92
4268 37	7593 64	6428 58	8563 207	2947 63

Total Number Right

Number	Value	Score
	30	

SET M—Addition—

7493	8937	8625	2123	5142	3691
9016	6345	4091	1679	0376	4526
6487	2783	3844	5555	4955	7479
7591	4883	8697	6331	9314	2087
6166	1341	7314	6808	5507	8165
5226	9149	6268	9397	7337	8243
2883	8467	7725	6158	2674	6429
2584	0251	8331	3732	9669	9298
0058	7535	5493	4641	5114	7404
2398	5223	3918	7919	8154	2575

Total Number Right

Number	Value	Score
	30	

SET N—Division—

67)32763	48)28464	97)36084	59)29382
78)69888	88)34496	69)40296	38)26562

Total Number Right

Number	Value	Score
	30	

SET O—Fractions—

				Number	Value	Score
$\frac{11}{15}+\frac{1}{6}=$	$\frac{9}{14}-\frac{1}{4}=$	$\frac{3}{4}\times\frac{5}{6}=$	$\frac{20}{21}\div\frac{1}{6}=$			
$\frac{5}{12}+\frac{2}{8}=$	$\frac{5}{6}-\frac{2}{21}=$	$\frac{5}{6}\times\frac{19}{20}=$	$\frac{11}{12}\div\frac{5}{8}=$			
$\frac{3}{4}+\frac{3}{18}=$	$\frac{3}{8}-\frac{3}{10}=$	$\frac{1}{6}\times\frac{3}{10}=$	$\frac{5}{6}\div\frac{11}{15}=$			
			Total Number Right		30	

Instructions for Examiners

Have the children fill out the blanks at the top of the first page. Have them start and stop work together. Let there be an interval of half a minute between each set of examples. The time allowances given below must be followed exactly.

Set A....30 seconds	**Set F.... 1 minute**	**Set K....2 minutes**
Set B....30 seconds	**Set G.... 1 minute**	**Set L....3 minutes**
Set C....30 seconds	**Set H....30 seconds**	**Set M....3 minutes**
Set D....30 seconds	**Set I.... 1 minute**	**Set N....3 minutes**
Set E....30 seconds	**Set J.... 2 minutes**	**Set O....3 minutes**

Have the children exchange papers. Read the answers aloud and let the children mark each example that is correct, "C." For each set let them count the number of C's and write the number at the end of the set in the first column; also on the first page.

The teacher should multiply the number of examples right by the number in the second column, writing the result in the third column. Then find the sum of the scores in the third column for a total score.

Scoring Arithmetic Results

The weightings given in the arithmetic test were estimates. They were set down in the effort to economise work in compiling the results. It soon appeared, however, that these weightings would introduce an error and they were abandoned. This made it necessary to work up the results in full. The method of procedure adopted was as follows: The median score for all the pupils of each grade was determined and set down in a table as indicated in Table 11. From such tables the median grade in each test was determined.

After all the results were thus compared, it was easily possible to determine a new set of weightings. These are not used in this report, but are given in Table 21 for the use of any one employing the test.

It seems wise in the light of experience to modify slightly tests L, M, and O. The new form of these tests recommended is given as follows: L is modified so as to avoid the repetition of the result "21." M is modified to give more space to the writing of results. O is modified because some children select the problems in multiplication and avoid the more difficult problems in addition and subtraction.

TABLE 21.—RELATIVE DIFFICULTY OF ARITHMETIC TESTS—EQUAL TIMES

Test	Grade						Average	Average 4–7	Cleveland survey
	3	4	5	6	7	8			
A	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
B	1.4	1.3	1.3	1.3	1.2	1.1	1.3	1.3	1.0
C	2.1	1.5	1.4	1.5	1.5	1.4	1.6	1.5	1.0
D	2.1	1.4	1.4	1.3	1.3	1.2	1.5	1.4	1.0
E	3.2	3.4	3.5	3.7	3.6	3.5	3.5	3.6	5.0
F	13.4	7.3	6.6	6.6	6.2	6.5	7.6	6.7	8.0
G	13.7	9.1	8.4	9.1	9.1	8.3	9.6	9.2	7.0
H	..	..	3.8	4.5	3.5	3.1	3.7	3.9	3.0
I	48.7	32.4	22.2	16.0	13.4	11.7	24.7	21.0	10.0
J	26.8	22.2	22.2	22.5	22.2	19.6	22.6	22.3	16.0
K	..	17.8	13.1	15.5	10.2	8.9	13.1	14.2	15.0
L	..	59.3	54.2	52.7	50.4	42.3	51.7	54.1	30.0
M	67.0	44.5	44.4	41.3	38.1	34.4	44.9	42.1	30.0
N	..	137.0	106.0	83.0	89.0	69.0	96.2	103.0	30.0
O	..	..	..	41.3	38.1	30.6	36.3	39.7	30.0

LETTER FROM SUPERINTENDENT OF SCHOOLS ON READING

May 15, 1915

To the Principals:

By today's mail there is being sent to each principal an envelope containing sets of instructions for conducting tests of oral and silent reading. These tests are to be given in the A divisions of each grade from the second through the eighth. Enough sets of instructions are being sent to give one to each teacher of these grades.

I trust that these instructions will be found self-explanatory. Should any questions as to their interpretation arise, inquiry may be made by telephoning to the office of the Survey Committee. Their telephone is Main 3838.

Sincerely yours,

J. M. H. Frederick,
Superintendent of Schools.

Tests of Reading—CLEVELAND FOUNDATION SURVEY —May, 1915

In order to make a study of reading, it is necessary to secure certain facts which are not ordinarily noted in every-day classroom work. Special methods will have to be adopted in order to secure these facts, but it is a fundamental mistake to think of these special recording methods as opposed in any way to the ordinary routine of class work, or to think of them as replacing for either pupils or teacher the regular instruction. A recording device is good just in the degree in which it fits into the regular work and at the same time gives a series of accurate results on the particular point on which information is sought.

Rates of Reading

All reading proceeds at some rate. Children in the same class differ in their rate of reading; children change in their rate of reading as they go up through the school. It is desirable that we get some exact facts about these different rates because rate is in itself important; because we find that

rate and ability to understand are inter-dependent; and because rate is one of the symptoms by which we can readily measure the stage of development of the pupil.

Interpretation and Reproduction

Again, the power to reproduce is cultivated in all reading exercises. This power differs greatly in different children, and is affected by the kind of ideas presented in the reading matter. It is a more difficult problem to find out how much children understand and are able to reproduce than to determine the rate of reading, but we must carry our investigation far enough to determine, by studies of the power to reproduce, how far the teaching has been effective in cultivating the child's understanding.

Measurement As Related To Instruction

Measurements of speed and power of interpretation will be worth collecting only when such measurements bring out the normal facts which are always present but are for the most part unrecorded in reading exercises. Whenever asked to measure speed or power of interpretation, the teacher should be sure first of all that the process of measuring does not change the character of the exercise as a real class exercise. Have a normal lesson. Be sure in every case that the pupils get out of the exercise just as much instruction as though no recording of facts were going on, and follow the reading with the most productive instruction that can be given.

Learning to Record Facts

The recording of facts presents certain difficulties. Usually a person who tries to record facts for the first time finds that he is distracted and inaccurate. The first principle which has to be laid down as applicable to all this work is therefore the following: Repeat each recording exercise several times until it becomes easy. Do not be discouraged if the record made the first time does not seem to go well.

Furthermore, do not throw away the first record. It is worth keeping for purposes of comparison.

Uniform Survey of Reading

This Survey will aim to find out as much as possible about reading in the Cleveland schools. In order to make comparison easy, the reading matter to be used for the final records of each type will be taken from the Jones Readers which are in every school.

Teachers are urged to try the tests with other passages than these designated for use in all schools. The more frequently the test can be made with various kinds of material, the better prepared will the teachers be to make the final uniform test. Records should be kept of all tests made. The prescribed passages from the Jones Readers should be used on a given day in each building after sufficient preliminary practice to insure that the teachers know how to make the tests.

Throughout the preliminary practice and the final uniform test, every reading exercise should be made a part of the regular instruction of the class.

Measuring the Rate of Oral Reading

The simplest measurement under the ordinary conditions of class work is probably a measurement of the rate of oral reading. This record can be made in any ordinary reading exercise. Do not let the children know that measuring is going on. Have them read as usual, but let the teacher have a watch and a pencil at hand. When a child begins to read, record his name and note the second at which he starts the paragraph. At the end of one minute put a mark in the book showing how much the child read. Let him read on without interruption to the end of the paragraph as he would in any reading exercise. Make whatever comments or ask whatever questions would be asked in an ordinary reading lesson and then go on with a second child. After class count up the lines read by each member of the class in 60 seconds and tabulate the records. It will be found that there are certain

differences in rate. Later we will learn more about each child when we measure his rate of silent reading and when we measure his power of reproduction.

How the Survey Will Use Records

By way of anticipation of the kind of use which will be made at the Survey office of these results, it may be pointed out that a comparison will be made of different grades and of the records from various parts of the city. It should be stated explicitly that good reading cannot be judged by speed alone. A very rapid rate of reading in a second grade for example would show that the exercise is not a reading exercise at all but a memory exercise. Too rapid reading in an upper grade would show lack of clear enunciation. No second grade and no eighth grade should stand out of its class either above or below. It is possible, therefore, through a general comparative study to check up any single set of figures by the general results. If a single set of figures is to be useful, it should reflect the facts faithfully. Good records are faithful records, not exceptional records.

It may be appropriate to remark in this connection that these records are not to be used to the advantage or disadvantage of any individual. The value of the reading matter, the stage of development of the children, and many other general factors will be brought out by this broad survey. The method will also be useful in directing the efforts of individual teachers. The latter advantage is one which the Survey ought to leave behind but it does not fall within the scope of the Survey to pass on individuals.

Measuring the Rate of Silent Reading

The second measurement is designed to bring out the facts regarding silent reading. All schools use silent reading in the requirement that pupils study geographies and histories, but too often silent reading is lost sight of as a special problem for the reading teacher. It may be difficult, because such

work has not been emphasized, to have an exercise in silent reading which shall not impress the children as unusual. It is especially urged therefore that this part of the study be preceded and followed in every case by some real instruction and questioning. For example, when a passage has been read silently, as will be directed below, let the teacher immediately verify the reports made by various children by asking them about all parts of the passage, especially that which they report that they read last. Repeat the measurement and the questioning with both familiar and unfamiliar matter until the pupils come to realize what a silent reading exercise really is. Furthermore, do not give any direction such as "repeat each word to yourself carefully," or otherwise try to influence the children to read silently by any fixed or prescribed method.

What is wanted is a clear record of how fast the child reads to himself in a normal way without skipping, on the one hand, or without unduly careful looking at each individual word, on the other.

It would be possible to take individual records of the rate of silent reading similar to those provided for in the section above on oral tests, but this is probably unnecessary since the class as a whole can be measured without serious difficulties. Start the class off all together. In order to do this, let the teacher read aloud to the whole class in a normal way some part of the page immediately preceding that which is to be used for the test. When all come to the turning of the page, let the teacher stop reading and note the exact time. Let the children go on in accordance with a pre-arranged plan, each reading to himself, with the understanding that there are going to be questions asked about what he has read. At the end of a minute have each child close his book and report, by reproducing it on paper, the last line which he read. He will not be able in most cases to report the line in exact form, but the teacher can judge by means of the written record how far the pupil has read. Now have some discussion of the passages so as to make sure that all read what they reported

and that they read without skipping. After school record the number of lines read by each. Try this several times.

A very good exercise for the pupils can be made of the requirement that they count the lines read, but their count should in each case be verified by the written record mentioned above.

Later Tests

Following these two kinds of tests will come others on the power of interpretation of the passages read. The detailed directions for these interpretation tests will be given out later.

Uniform Test in Oral Reading

After several preliminary tests of oral reading have been made by the methods described, and the results entered on the tabulating sheet, the uniform test should be given. In order that the pupils of a given grade throughout the city may read the same material, the following selections have been chosen from the Jones Readers for this test:

Grade	Book	Selections	Pages
2A	II	Nathan and the Bear	94–100
		Ruff's First Adventure	118–123
3A	III	Peter Johnson's Boots	57– 60
		Rosamond and the Purple Jar	150–153
4A	IV	Prof. Frog's Lecture	116–126
		Queen Alice	129–136
5A	V	Golden Touch	29– 39
		Moses at the Fair	69– 71
6A	VI	A Gallop of Three	13– 17
		A Hunting of the Deer	47– 53
7A	VII	An Old-Fashioned Snow Storm	63– 66
		A Cellar in Siberia	77– 80
		Charley	20– 24
8A	VII	Surrender of Granada	161–167
		Destruction of Pompeii	176–182

At the conclusion of this test the results should be entered on a new tabulating sheet.

Uniform Test in Silent Reading

After several preliminary tests of silent reading have been made by the methods described and the results entered on the

tabulating sheet, the uniform test should be given. The same tests will be given in each grade throughout the city. They will be taken from the Jones Readers as follows:

Grade	Book	Preliminary Page	Test Pages
2A	II	101	102–103
3A	III	97	98– 99
4A	IV	61	62– 63
5A	V	47	48– 49
6A	VI	63	64– 66
7A	VII	73	64– 66
8A	VII	247	248–249

At the conclusion of this test the results should be entered on the tabulating sheet for the results of the uniform test in oral reading.

What the Measurements Show

Teachers will note in their own results the following facts:

1. Children differ radically.

2. Passages differ in difficulty but the various children in each class are likely to show fairly uniform relative standings whatever the character of the passages. Especially may it be noted that unfamiliar passages are sometimes easier than familiar passages.

3. The rates of silent and oral reading differ.

The directions as to procedure have been for the most part given in the foregoing discussion. The following details may be added.

In counting be sure that a line which is shortened by a picture is counted as a part line.

At the end of a paragraph count all lines that are half lines or more as though they were full lines. If such a line is less than a half line, ignore it.

Be sure that you test in all cases for recognition of meaning so that the pupils will not be tempted to skip or make extravagant reports.

Make all tests frequently enough so that you have confidence in your reports.

It is suggested that from the beginning each teacher try

some written tests of the power to reproduce passages so that when that kind of work begins for the Survey there will be a clear notion of the precautions which are necessary.

Complete Work by May 21

The tests described should be completed on or before May 21 and the record sheets sent to the Survey Office at 612 St. Clair Avenue East, Room 25. It is urgently requested that all schools send in, not merely the results collected with the designated selections, but also as many of the earlier results as possible. In each case where tests are made with passages other than those designated, report book and page of material.

Calculation of Mean Deviations

The mean deviations recorded in Table 13 are calculated by first determining the average number of lines read by the grade. This average is then compared with each individual pupil's record and the difference or deviation of each record from the average is determined. These deviations are then added without reference to their positive or negative signs, and the average or mean of all the deviations from a given average is calculated. This gives the mean deviation.

1

A boy had a dog.
The dog ran into the woods.
The boy ran after the dog.
He wanted the dog to go home.
But the dog would not go home.
The little boy said,
"I cannot go home without my dog."
Then the boy began to cry.

2

Once there were a cat and a mouse. They lived in the same house. The cat bit off the mouse's tail. "Pray, puss," said the mouse, "give me my long tail again."

"No," said the cat, "I will not give you your tail till you bring me some milk."

3

Once there lived a king and queen in a large palace. But the king and queen were not happy. There were no little children in the house or garden. One day they found a poor little boy and girl at their door. They took them into the palace and made them their own. The king and queen were then happy.

4

One of the most interesting birds which ever lived in my bird-room was a blue jay named Jakie. He was full of business from morning till night, scarcely ever still. He had been stolen from a nest long before he could fly, and he had been reared in a house long before he had been given to me as a pet.

5

The part of farming enjoyed most by a boy is the making of maple sugar. It is better than blackberrying and almost as good as fishing. One reason why a boy likes this work is that someone else does most of it.

It is a sort of work in which he can appear to be very industrious and yet do but little.

6

It was one of those wonderful evenings such as are found only in this magnificent region. The sun had sunk behind the mountains, but it was still light. The pretty twilight glow embraced a third of the sky, and against its brilliancy stood the dull white masses of the mountains in evident contrast.

7

The crown and glory of a useful life is character. It is the noblest possession of man. It constitutes a rank in itself, an estate in the general good will, dignifying every station and exalting every position in society. It exercises a greater power than wealth, and is a valuable means of securing honor.

8

He was six feet tall and his body was well proportioned. His complexion inclined to the florid; his eyes were blue and remark-

ably far apart. A profusion of hair covered the forehead. He was scrupulously neat in his appearance; and, although he habitually left his tent early, he was well dressed.

9

Responding to the impulse of habit, Josephus spoke as of old. The others listened attentively but in grim and contemptuous silence. He spoke at length, continuously, persistently, and ingratiatingly. Finally exhausted through loss of strength he hesitated. As always happens in such exigencies, he was lost.

10

The attractions of the American prairies as well as of the alluvial deposits of Egypt have been overcome by the azure skies of Italy and the antiquities of Roman architecture. My delight in the antique and my fondness for architectural and archæological studies verge onto a fanaticism.

11

The hypotheses concerning physical phenomena formulated by the early philoso-

phers proved to be inconsistent and in general not universally applicable. Before relatively accurate principles could be established, physicists, mathematicians, and statisticians had to combine forces and work arduously.

DIRECTIONS FOR GIVING ORAL READING TESTS

The test should be given in a quiet and light place. Give the following directions—"I should like you to read some of these paragraphs for me. Begin with the first paragraph when I say 'Begin.' Stop at the end of each paragraph until I say 'Next.' If you should find some hard words read them as best you can without help and continue reading."

While the pupil is reading record two sets of facts in regard to the reading. a—The time required to read each paragraph; b—The errors made. The time record is secured by noting the exact second at which the pupil begins reading a paragraph and the time when he completes it. The number of seconds required to read the paragraph should be recorded in the margin to the right of the paragraph.

In order to illustrate clearly the character of errors and the method of recording them the following paragraph is inserted:

The sun pierced into my large windows.
It was the opening of October, and the
sky was of a dāzzling blue. I looked
out of my window and down the street.
The white houses of the long, straight
street were almost painful to the eyes.
The clear atmosphere allōwed full play
to the sun's brightness.

If a word is wholly mispronounced, underline it as in the case of atmosphere.

If a portion of a word is mispronounced, mark appropriately as above: pierced pronounced in two syllables, sounding long a in dazzling, omitting the s in houses or the al from almost, or the r in straight. Omitting words are marked as in the case of "of" and "and"; substitutions as in the case of "many" for "my"; insertions as in the case of "clear"; and, repetitions as in the case of "to the sun's."

Each pupil should be allowed to continue reading until he makes at least the following number of errors in two successive paragraphs: 5 errors or more in 40 or more seconds, or seven or more errors in case the paragraph is read in less than 40 seconds.

Directions for Giving Silent Reading Tests

Do not test first grade pupils in silent reading. Test grades 2 and 3 with "Tiny Tad"; grades 4, 5, and 6 with "The Grasshoppers"; grades 7 and 8 with "Ancient Ships."

Hand the appropriate card to the pupil with the following directions: "Read the story on this card to yourself. Read it from beginning to end without stopping or repeating any of it. Read the story rapidly but carefully. Read the difficult words as best you can and go on without asking about them. Be ready to tell the story or answer any question about it when you are through. Do you understand?"

As the pupil reads, secure the time record as follows: Note the exact second at which the pupil shifts from the bottom of the first column to the top of the second. Note carefully when he shifts to the top of the third column. Record the time required to read the second column.

At the top of a sheet of paper, write the pupil's name, his school and grade, and the time required to read the middle column. If the pupil has been reading "Tiny Tad" have him tell you the story according to directions on the Report Blank. Write as rapidly as you can on the sheet of paper just what the pupil says. If he talks too rapidly have him

tell it to you by sentences. When he discontinues speaking, ask him once, "Is there anything else?" Following this, ask the questions, and record the answers on the sheet of paper. Number the answers—do not copy the questions. If the pupil has been reading "The Grasshoppers" or "Ancient Ships" hand him the sheet of paper and a set of directions. Go over these directions with him and when he understands just what he is to do, leave him to himself and test the next pupil.

General Comments

The testers should work in pairs. Select a co-worker and choose a school.

Do preliminary testing with five pupils on Tuesday or Wednesday.

Go to your school early and make arrangements with the principal for a place in which to work and arrange to have the pupils sent to you in groups of five. The five pupils from each grade should be from an A division of that grade and should consist of the best boy and girl in reading, the poorest boy and girl and either a boy or a girl of average ability.

Co-operation of Normal School Seniors

In order to insure the proper administration of these tests a demonstration was given before the group of seniors of the Normal School who were to carry out the tests in the schools.

The method of calculating the results of these tests and the justification for this method may be given as follows:

A record sheet was devised which would indicate all of the reactions of the pupil to each passage. The following is a description of the tabulation sheet for an individual record.

Scoring Results in Oral Reading

The record of each pupil for each paragraph is entered separately in the table. The abbreviations G N S A under "Pupils" refer respectively to grade, number of pupil in order of achievement, sex, and age. The abbreviations T G

M O S I R under each paragraph refer respectively to time in seconds, gross errors, minor errors, omissions, substitutions, insertions, and repetitions.

The record of the first pupil entered in the table reads as follows: The pupil was in the second grade, ranked highest in the class, and was a girl seven years old. She read the first four paragraphs of the scale respectively in 13, 19, 20, and 25 seconds with no errors in each case. The record of the last pupil entered reads as follows: This second grade pupil ranked lowest in the class, and was a boy seven years old. He read paragraph one in 40 seconds with one gross error and two repetitions. He read paragraph two in 46 seconds with two minor errors, two omissions, two substitutions, and one repetition. The other paragraphs were too difficult for him.

The reduction of this individual score to a simple numerical statement depends upon the fact that a certain number of errors may reasonably be expected for each passage read. A certain amount of time must be allowed for the reading. If now the pupil exceeds the amount of time which has been found in earlier investigations to be common for this paragraph, and if the number of errors increases, the amount of credit which he gets for reading the passage should be proportionately reduced. A number of standards were set up, as indicated below in the list of standards.

A record is checked as a failure if

A. It is not read because of previous failures.
   It is read in 40 or more seconds with five or more errors.
   It is read in less than 40 seconds with seven or more errors.

B. It is not read because of previous failures.
   It is read in 30 or more seconds with four or more errors.
   It is read in less than 30 seconds with five or more errors.

C. It is not read because of previous failures.
   It is read in 25 or more seconds with three or more errors.

TABLE 22.—TABULATION SHEET FOR INDIVIDUAL RECORDS IN ORAL READING

Pupils				Paragraph 1							Paragraph 2							Paragraph 3							Paragraph 4						
G	N	S	A	T	G	M	O	S	I	R	T	G	M	O	S	I	R	T	G	M	O	S	I	R	T	G	M	O	S	I	R
2	1	G	7	13	.	.	.	.	.	.	19	.	.	.	.	.	.	20	.	.	.	.	.	.	25	.	.	.	.	.	.
2	2	G	7	15	.	.	.	.	.	.	20	.	.	.	1	.	.	20	.	.	.	1	.	.	25	.	.	.	.	.	.
2	3	B	8	12	.	.	.	.	.	.	20	.	1	.	1	.	.	37	1	.	.	1	.	1	35	1	1	1	.	.	1
2	4	G	7	28	.	.	.	1	1	1	35	.	.	.	.	.	1	38	.	.	.	1	.	1	63	1	.	.	3	.	1
2	5	G	7	19	.	.	1	.	.	1	20	.	.	.	1	.	1	38	1	.	.	2	.	1	45	1	.	.	1	1	3
2	6	G	8	27	.	.	.	.	1	.	39	.	1	.	.	.	2	55	.	2	.	1	.	1	69	1	2	.	2	1	2
2	7	B	7	40	1	.	.	.	.	2	46	.	2	2	2	.	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.

It is read in less than 25 seconds with four or more errors.

D. It is not read because of previous failures.
It is read in 20 or more seconds with two or more errors.
It is read in less than 20 seconds with three or more errors.

Individual scores were determined by applying each of the four standards to the pupil's record for each paragraph. If the paragraph was read successfully under the conditions of two of the standards, the figure "2" was entered in an appropriate column of the score sheet; if the reading met the conditions of one, three, or four of the standards, the appropriate figure was entered on the sheet. As shown in Table 22, pupil 7 read paragraph one in 40 seconds with three errors. It is apparent that this paragraph was read successfully according to the conditions of Standards A and B. The record does not meet the conditions of Standard C because it required more than 25 seconds to read it and there were three errors. Since the reading was a failure according to Standard C, it was also a failure according to Standard D, which is more difficult. Therefore, the paragraph was read successfully under two standards.

Paragraph two was read in 46 seconds with seven errors. An application of Standard A shows that the reading was a failure according to the conditions of the most liberal standard and hence a failure under the conditions of each of the more difficult standards. Therefore, the paragraph was read successfully under none of the standards.

The total score for a class was determined by finding the sum of all the successes recorded for each paragraph. Since the highest possible number of successes per paragraph is four times the number of pupils tested, the total score for the class should be four times the number of pupils tested. The average score for a grade was determined by dividing each item of the total score by four.

Description of Score Sheet for Individuals and Classes:

The abbreviations G N S A under "Pupils" refer respec-

tively to the grade, the number of pupils in the order of achievement, the sex, and the age. The numerals under "Paragraph" refer to the paragraphs of the scale in order. The entries in the table refer to the number of successful readings for each paragraph when scored by each of the four standards. The table reads: The first pupil entered in the table was a second grade pupil, ranked highest in the class, and was a girl seven years old. She read paragraphs 1, 2, 3, 4, 5, and 6, successfully under all four standards, paragraph 7 under one standard, and the remaining paragraphs under none of the standards. The total class score and the average class score are presented at the foot of the table.

TABLE 23.—SCORE SHEET FOR INDIVIDUALS AND CLASSES IN ORAL READING

Pupils				Paragraph											
G	N	S	A	1	2	3	4	5	6	7	8	9	10	11	12
2	1	G	7	4	4	4	4	4	4	1					
2	2	G	7	4	4	4	4	2	2	1					
2	3	B	8	4	3	2	1	2							
2	4	G	7	2	4	3									
2	5	G	7	4	3	1									
2	6	B	8	4	2	1									
2	7	B	7	2											
Total class score 28 cases				24	20	15	9	8	6	2					
Average class score—7 cases				6	5	4	2	2	1.5	.5					

The various passages that were employed for this test were of different degrees of difficulty. The exact degree of difficulty in each case can be determined from the tests themselves. Furthermore, the same passages had been used in earlier investigations in various schools in the state of Illinois. All told, the material available for scaling the passages amounts to tests with 3,299 pupils. One thousand, one hundred and six of them were from 23 schools in various parts

of Illinois. Two thousand, one hundred and ninety-three of them were from 44 schools in Cleveland.

The score for a given class or grade may be determined as follows: Find the average class score as indicated in Table 23. The average class score for the second grade class mentioned in Table 23 was as follows: an average of 6 successful readings of paragraph 1; 5 successful readings of paragraph 2; 4 successful readings of paragraph 3; 2 successful readings of paragraph 4; 2 successful readings of paragraph 5; 1.5 successful readings of paragraph 6; .5 successful readings of paragraph 7. According to Table 24, 35 points credit are given for each successful reading of paragraph 1; 6 successful readings amount to a total score of 210. To this should be added 10 additional points to each of 5 successful readings of paragraph 2; 5 additional points to each of 4 successful readings of paragraph 3; 5 additional points to each of 2 successful readings of paragraph 4; 5 additional points to each of 2 successful readings of paragraph 5; 5 additional points to each of 1.5 successful readings of paragraph 6; and 2.5 additional points for .5 successful readings of paragraph 7. The total score is the sum of 210, 50, 20, 10, 10, 7.5, 2.5, or 310. Since there were seven members to this class the average score for the class is one-seventh of 310, or 44 +. This score is noticeably above the average.

The horizontal row of numbers at the top of the table marks off 20 equal steps between zero and 100. These numbers may be interpreted either as indicating the relative difficulty of the paragraphs or the amount of credit which should be given for the successful reading of the various paragraphs. The Roman numerals to the left of the table refer to the eight grades of the elementary school. The entries in the table refer to the respective paragraphs of the series of standardized paragraphs. The table reads as follows: In the first grade a class which reads paragraph 1 successfully should receive a credit of 55 points; for reading paragraph 2 successfully it should receive 10 additional points, or a total of 65 points; for reading paragraph 3 successfully it should

receive five additional points, or a total of 70 points, etc. In the second grade the successful reading of paragraph 1 does not represent so great an achievement as in the first grade. According to the table, a second-grade class receives a credit of 35 points for reading paragraph 1 successfully.

The tabulation of the results for the different grades calls for a recognition of the fact mentioned in the text (page 136) that "ability to read a certain passage without error really means less on the part of a child in the upper grades than on the part of a child in the lower grades." The grounds for the adoption of the scale employed in the diagrams are briefly as follows.

Upon the basis of the type of scoring just outlined, the steps of difference in difficulty between the paragraphs and the shifts in difficulty from grade to grade have been determined and are represented in Table 24.

TABLE 24.—A MEASURE FOR ORAL READING

	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
I	..	..	..	..	..	..	..	..	..	..	1	..	2	3	5	6	7	..	..	..
II	..	..	..	..	..	..	1	..	2	3	5	6	7	8	9	..	..	..	..	..
III	..	..	..	..	..	1	..	2	3	5	6	7	8	9	..	10	11	..	..	..
IV	..	..	..	..	1	..	2	3	5	6	7	8	9	..	10	11	..	..	..	..
V	..	..	..	1	..	2	3	5	6	7	8	9	..	10	11	..	..	..	..	..
VI	..	..	1	..	2	3	5	6	7	8	9	..	10	11	..	..	..	..	..	..
VII	..	1	..	2	3	5	6	7	8	9	..	10	11	..	..	..	..	..	..	..
VIII	1	..	2	3	5	6	7	8	9	..	10	11	..	..	..	..	..	..	..	..

Attention is drawn to the fact that the various comparisons made in the text do not depend for their validity on the foregoing calculations. Once the norm for each grade in Cleveland is established, the position of any grade above or below this norm can be determined and comparison with the norm is valid quite apart from the method of describing the norm.

Tests of Silent Reading

The passages used for the tests of silent reading were printed on cards so that they could be easily handled. They were

printed in three sections. The middle section contained 100 words in the case of the easiest selection, and it contained 200 words each in the case of each of the two more difficult selections. The section at the left of the middle section serves a double purpose. First, it gives the pupil something to read by way of preparation for the test part of the passage. Second, the tester can readily determine the moment at which the reader moves his eyes from the bottom of the card to the top of the card where the words upon which the time record is based begin. In the following passages the ends of sections are indicated by the heavy dashes.

The passages used are as follows:

TINY TAD

(For Second and Third Grades)

Tiny Tad was a queer little fellow with only two legs and a short tail. He was nearly black, too, and much smaller than most tadpoles in the big pond. He could hardly wait for his front legs to grow.

"When I have them all," he said, "I'll leave this dirty water and go up into the orchard. What fun it will be to hop and hop and hop. If only I had a little brother to hop with me, I should be so happy.

It wasn't long before his legs began to grow. He moved about and kicked around

until his legs were quite strong. "I am going out on the bank to see if I can hop," he said one night when he was just six weeks old.

The sun was hardly up the next morning

---

when a little toad jumped out of the water and hopped up on the bank. He was very small, but none too small for the little legs that wobbled under him. It was Tiny, the young toad.

THE GRASSHOPPERS

(For Fourth, Fifth, and Sixth Grades)

The grasshoppers were among the worst enemies of the early settlers of Nebraska. Their homes were on the high plains and among the hills at the foot of the great mountains in the West. Here they lived and raised their families.

In dry seasons there were more children and less food at home. Then they assem-

bled and flew away in great swarms to the east and to the south. They traveled hundreds of miles. Sometimes on clear warm moonlight nights they traveled all night. More often they settled down late in the afternoon and fed, and then continued their way the next day.

The great grasshopper raid took place in September, 1874. Suddenly along the frontier states the air to the west was filled with grasshoppers. There were billions of them in the great clouds which darkened the sun. The noise of their wings filled the air with a roaring sound like a rushing storm, followed by a deep hush as they dropped to the earth and began to devour the crop.

All the corn was eaten in a single day. Where cornfields stood at sunrise nothing remained at night but stumps of stalks swarming with hungry hoppers struggling for the last bite. They stripped the garden patches bare. They gnawed great holes in the rugs and carpets put out to save favorite

plants. The buds and fruit of trees were consumed. They followed the potatoes and

onions into the ground. When they finished the garden and green crops they attacked the wheat and oats in the shock and the wild grass in the unplowed fields. Only two green crops escaped them, broomcorn and sorghum cane. They did not seem to have a sweet tooth.

ANCIENT SHIPS

(For Seventh and Eighth Grades)

There is no more interesting study to marine architects than that of the growth of modern ships from their earliest form. Ancient ships of war and of commerce equally interest them; but as they study the sculptures and writings of the ancients, they find records of warships far outnumbering ships of commerce.

Among ancient nations, the Greeks and Romans were the best shipbuilders. Judg-

ing from the description of their works, their crafts must have been elegant, swift, and seaworthy. This is more than can be said of many of the more showy productions of the ship-yards of Britain, France, and Spain even so late as the Middle Ages.

There is no question now that the ships of the ancients made extended voyages urged by oars alone. A thousand oarsmen were sometimes required to man the sweeps besides a crew of five hundred soldiers and sailors. Written descriptions give us splendid pictures of fleets of these ancient ships moving swiftly along the villa-dotted shores of Greece, or majestically sweeping into some mirror-like harbor, and with sounding trumpets saluting the setting of the low, western sun.

We are able to make from old records very fair models of these ancient warships. One writer describes the great galley of Philopator as propelled by forty banks of oars. His description is questioned, for however plain

the description of these warships may be, no one has yet shown the precise manner in which forty banks could be arranged. A bank of oars means a row on one deck, and

---

while there are many pictures of galleys they show nothing more than a trireme, which is a ship of three banks. A ship of forty banks puzzles our imagination.

In order to make a comparison between the passages used for the lower and the higher grades, the fourth and sixth grades read two passages each. On the basis of the two records from each of these grades, the comparative difficulty of the passages can be calculated. It is found that 200 words in the easiest passage are equivalent in reading difficulty to 121 words of the intermediate passage and to 97 words in the most difficult passage. In Diagrams 40 and 41 a correction is introduced, recognizing this difference.

The quality of silent reading is determined as follows: All wrong statements, all irrelevant statements, and all repetitions, are checked from the pupil's reproduction and the remaining words counted. The percentage that these words are of the total number of words forms the reproduction grade. For each question answered correctly, a grade of 10 points is given. The average of the reproduction grade and the grade received for correct answers to questions is found. This average grade forms the quality mark in silent reading for the individual pupil.

Letter From Superintendent of Schools on Kindergartens

May 25, 1915

To Elementary School Principals:

For the purposes of the Survey we wish to secure from the kindergartners and from the primary teachers throughout the city, reports on the work of the kindergartens. If there are several first-grade teachers in your building, I suggest that you have them meet as a committee and prepare a report based on the questions we are putting to them.

The following questions are intended for each group. It is not the purpose of these questions to limit absolutely the scope of the reports. If other matters are thought to be important, please encourage either the kindergartners or the first-grade teachers to include them in their reports, but we shall be glad to have explicit statements on each of the points referred to in the questions. Please have these reports prepared as soon as possible, in any case not later than the 4th of June. The reports should be as brief as is consistent with covering the points presented. When they are completed, they should be forwarded to the office of the Survey at 612 St. Clair Ave., East.

The reports made by the primary teachers should answer the following questions:

1. How does the work of the kindergarten differ in its methods and content from the work of the first grade?
2. What provisions are made for using in the first grade the results of training given to the children in the kindergarten?
3. What advantage or disadvantages of kindergarten training do you observe in your work in the first grade?
4. Do you suggest any modifications of the present situation especially with a view to bringing about a closer relation between first grade and kindergarten?

The reports made by the kindergarten should answer the following questions:

1. What are the different kinds of activities undertaken in your kindergarten? For example, do you have paper cutting, gardening, singing, language exercises, etc.
2. How are the time and effort determined which are devoted to each of these types of activity? Do you have a regular program? Does the principal of the school pass on the program or on the work?
3. What phases of the work of the kindergarten aim to prepare directly for the first grade? What are the most

striking respects in which the kindergarten work differs from work in the first grade?

4. How far does the first grade teacher actually take advantage of the work done in the kindergarten?

5. What suggestions can you make looking toward a closer inter-relating of the kindergarten and the first grade?

Sincerely Yours,

J. M. H. Frederick.

RANKS OF PUPILS IN ELEMENTARY AND HIGH SCHOOLS

The card on which information was collected regarding the ranks of pupils in the elementary schools and high schools is as reproduced on this page.

NAME OF STUDENT

FAMILY NAME FIRST NAME MIDDLE INITIAL

ELEMENTARY SCHOOL FROM WHICH STUDENT CAME

ENTERED FEB. 1914? SEPT. 1914?

IF STUDENT HAS DROPPED OUT NOTE FACT HERE

	MARK	POSITION
AVERAGE IN ALL H. S. SUBJECTS FOR 1ST HALF YEAR OF ATTENDANCE		
AVERAGE IN H. S. ENGLISH FOR 1ST HALF YEAR OF ATTENDANCE		
AVERAGE IN H. S. MATHEMATICS FOR 1ST HALF YEAR OF ATTENDANCE		
AVERAGE IN ALL SUBJECTS IN 8A GRADE		
AVERAGE IN READING, SPELLING, AND GRAMMAR IN 8A GRADE		
AVERAGE IN ARITHMETIC IN 8A GRADE		

Complete directions were sent, as indicated by the following letters to principals of high schools and elementary schools:

Letter to High School Principals on Ranks of Pupils

To High School Principals:

The accompanying cards are designed to secure in compact form the records in both high school and elementary school of all students who entered the high schools of the city in February, 1914 (this group is called for in order to insure complete records), and in September, 1914. Please make out a card for each student who entered, even if he dropped out without establishing a full record. Please make out all of the records, including the name of the elementary school from which the student came. Fill out all the items except the three questions relating to elementary school records. Leave the elementary school records blank. The cards will be redistributed in the Survey office and sent to the proper elementary schools to be completed.

Two scholarship records are asked for. The first column headed "Marks" requires no explanation. It calls for the mark commonly used in the school.

The second column of the records requires explanation. All of the students in the group entering in September should be considered at first as a single group. In the same way all entering in February should be treated as another group. Then divide each of the groups in such a way that the numerical third of each group that received the highest grades or marks are recognized as belonging to position 1; those who belong in the numerical third of the class receiving the lowest marks belong in position 3; and the numerical third of the class who received the middle marks belong to position 2.

The following method of procedure should be adopted in filling out the column "Position." Keep separate the two sets of cards belonging to the September and February groups. Proceed with each group separately as follows: First, make all other entries on the card, leaving the column "Position" blank. Next, arrange all cards in order of rank with reference to the first entry, that is, the entry "Average in all H. S. subjects for 1st half year of attendance." If several students have the same mark, put the cards bearing like marks in alphabetical order. After the cards are arranged in order of rank, count out the first third of the whole number of the class without reference to the point in the marking scale at which the division falls, and enter the figure 1 in the "Position" column for all who are in the upper third of the group; the figure 2 for the next lower third of the group; and the figure 3 for the lowest third.

Rearrange the cards in each group with reference to the

marks under "Average in H. S. English" and enter in the "Position" column the figure indicating the numerical third of the class in which the student is found with reference to English. This classification in English position is entirely independent of the classification first made on the basis of averages in all subjects.

Third, find in like manner "Positions" in mathematics.

When this work is completed, please enclose all the cards in a package plainly marked with name of the high school and send them to the office of the Survey Committee, 612 St. Clair Avenue, East.

Letter to Elementary School Principals on Ranks of Pupils

To the Principals of Elementary Schools:

The accompanying cards have been filled out by the high schools for all students who entered these institutions during the past year. We now ask that information be supplied with regard to the standing of these students in the elementary school.

You are sent herewith all of the cards referring to your school. Please go over these cards and mark them in the following way: First, enter in the column headed Mark the standing or mark usually employed in putting down the elementary school standings. The marks to be used are those of the last half year in the pupil's course in elementary school. Second, put together in one group the cards of all children who completed their elementary work in January, 1914; in another group the cards of all children who completed their elementary work in June, 1914; and in a third group the cards of all who completed their work at any other time. The third group will not require any further entries and are to be sent back with the one mark above described.

Each card of the other groups is to have three more entries. The first entry to be set down opposite Average in all Subjects in 8A Grade in the column headed Position is to be found as follows: From your record for the class of January, 1914, determine what child had the highest average in all subjects in that grade quite irrespective of whether he went to the high school or not. Then in order to determine who was next highest and so on down the list until you come to the child who stood at the bottom of the class. In case several children have the same Average in All Subjects, put the like standing cases in alphabetical order. When all

the children have thus been set down in a list from the highest to the lowest, count out the highest numerical third. That is, if the class was made up of 27, take the highest nine. If the class was made up of 25, take the highest eight and note the mark of the lowest number of this one-third. Also count out the lowest third and note the mark of the highest member of this third. If the number of members of the class does not permit an even division into thirds, let the largest third be the middle third. Now, knowing the marks which limit the highest and the lowest thirds, go back to the cards filled out by the high schools and enter into the column headed POSITION the number "1" for each child whose mark falls within the limits of the highest third. Enter the figure "3" for each child who falls below the limit set for the lowest third, and the figure "2" on all other cards.

Now rearrange the members of the whole class on the basis of AVERAGES IN READING, SPELLING, AND GRAMMAR. Divide the whole class into thirds again and enter in the column for POSITION the figure "1" for those who fall in the highest third. "2" for the middle third, and "3" for the lowest. The placing of the pupils in this case is entirely independent of the placing described above in AVERAGE IN ALL SUBJECTS.

Rearrange the class a third time on the basis of their marks in arithmetic. In every case use the whole class in determining thirds. Note also that the arrangement for arithmetic is independent of the two earlier arrangements.

After disposing of the class of January, 1914, repeat the same processes with the class of June, 1914.

When the work is completed, please return the cards to the office of the Cleveland Foundation Survey, 612 St. Clair Ave., East.

USE OF DATA ON ELEMENTARY AND HIGH SCHOOL RANKS

After the entries were made, it was a relatively simple matter to distribute the individual cards in such a way that all the students could be classified as belonging in one or another of the thirds of the class. For the general results only the tables dealing with the averages were used. In a later calculation the marks in English and mathematics were also worked up to find out whether or not the character of the results would be modified by using one subject only. Table 25 shows the total body of material that could be employed.

TABLE 25.—DATA USED IN COMPARING RANKS OF PUPILS IN ELEMENTARY AND HIGH SCHOOLS

High School	Number of cards having data	Number of cards not having data	Total
Central	312	61	373
East	305	9	314
Glenville	159	9	168
Lincoln	112	3	115
South	114	7	121
West	126	10	136
East Technical	574	49	623
West Technical	247	15	262
West Commerce	164	16	180
East Commerce	61	16	77
Collinwood	21	4	25
Total	2,195	199	2,394

Correcting Results of Study of Ranks

As indicated in the text, there is a mathematical complication which must be recognized in tabulating any results. The number of pupils who come to a given high school with a certain rank from the elementary school may be so great that it is quite impossible for them all to hold their rank in the corresponding third of the class in the high school. Furthermore, when we deal with the pupils of the public school system of Cleveland, we must recognize the fact that certain students in each of the high schools came from other sources not included in the report.

An example may make the preceding discussion somewhat more evident. Suppose that 10 students from elementary school A enter high school X. Further suppose that in the elementary school six of these students were in the highest third, three were in the middle third, and one was in the lowest third. In the high school these students were arranged as follows: Three in the highest third, four in the middle third, and three in the lowest third. The sum of the rankings in the elementary school is 15; the sum of the rankings in the

high school is 20; the quotient obtained by dividing the first sum by the second is .75. This would seem to indicate a relatively poor elementary school. However, one very important factor has been neglected, namely, the mathematical necessity of the pupils' arranging themselves in the high school in three equal groups. Central High School, for example, received from the elementary schools 341 pupils whose records could be secured by the Survey office. In the elementary school 152 of these had been in the highest third; 119 in the middle third; and 70 in the lowest third.

Now it is clear that in the high school these pupils would fall into the following groups if students did not enter from parochial, private, and out-of-town schools: 114 in the highest third, 114 in the middle third, and 113 in the lowest third. In other words, 38 pupils who had position 1 in the elementary schools must fall into position 2 in high school. Moreover, 43 pupils who had the position 2 in the elementary schools must fall into position 3 in Central High School. Manifestly, it would be unjust to the elementary schools to consider them inefficient because their graduates lost rank in Central High School, since this loss in rank might be due solely to the mathematical exigencies of the situation. It was clear that position 1 in the elementary schools sending pupils to Central High School does not mean 1 when compared with position 1 in that high school. It really means something between 1 and 2 just as 2 means something between 2 and 3.

Because of the inaccuracy that would enter if the foregoing method of comparison were employed, it was felt that recourse should be had to some other method. Something must be done to counterbalance this mathematical push and enable us to compare the records of pupils in the elementary schools with the records of the same pupils in the high school without prejudice to either type of school. The situation was further complicated by the fact that the high schools had pupils from private, parochial, and out-of-town schools as well as from the public schools. As a matter of fact, the pupils whose records were secured in full did not divide into three

equal groups in the various high schools. In East Technical High School, for example, the division was into the following groups on the basis of high school marks: 201 in the highest third, 193 in the middle third, 180 in the lowest third. We might have expected the following grouping: 191 in the highest third, 192 in the middle third, and 191 in the lowest third.

The following method of computing the real meaning of the elementary marks 1, 2, and 3 was hit upon. Our illustration is drawn from East Technical High School.

	Position 1	Position 2	Position 3	Total
Elementary marks	160	225	189	574
East Technical marks	201	193	180	574

The preceding table means that the Survey office secured records of 574 public elementary school students who entered the first year class of East Technical High in the year 1914. Of all these, 160 had been in the highest third in the elementary schools, 225 in the middle third, and 189 in the lowest third. In the East Technical High School these same students arranged themselves thus: 201 in the highest third, 193 in the middle third, and 180 in the lowest third. This case is radically different from that of Central High. In Central High a number of students had to lose rank because there were more students marked 1 by the elementary schools than could possibly be marked so by the Central High School. On the other hand, in the case of East Technical High there were more students marked 2 and 3 by the elementary schools than could possibly be so marked by the East Technical High. Hence a number of students entering East Technical High had to improve their rankings, and the fact of their doing so should not be considered as reflecting discredit upon the East Technical High, or credit upon the elementary schools. An adjustment must be made for the mathematical push. If, after this adjustment has been made, the pupils from any particular elementary school improve on their rankings, then

that elementary school is deserving of praise; and, conversely, if the pupils from an elementary school lose ranking, that elementary school seems to be inefficient, in so far as one of its functions is to fit pupils for secondary school work.

The figures previously given show that of the 189 pupils rated 3 by the elementary schools, 180 continued in the third position in East Technical High, while nine advanced to position 2. Hence the summation of their rankings is obtained thus: $180\times3+9\times2=540+18=558$. Dividing this sum 558 by the number of pupils, 189, gives 2.95 for the quotient. In like manner, of the 225 pupils rated 2 by the elementary schools, 184 continued in that position in East Technical High, while 41 advanced to position 1. Hence the summation of the rankings of these 225 pupils is obtained thus: $184\times2+41\times1=368+41=409$. Dividing this sum, 409, by the number of pupils, 225, gives 1.82 for quotient.

To sum up, then, it may be stated that for pupils entering East Technical High, the mark 3 really means 2.95, the mark 2 means 1.82, and the mark 1 means 1. In the tables given later showing how each elementary school prepares its pupils for East Technical High, the preceding correction will be made. A similar co-efficient has been worked out for each high school. These co-efficients are shown in Table 26.

TABLE 26.—VALUE OF ELEMENTARY RANKS IN THE VARIOUS CLEVELAND HIGH SCHOOLS

High School	Position 1	Position 2	Position 3
Central	1.26	2.34	3
East	1.27	2.38	3
Glenville	1.29	2.42	3
Lincoln	1.32	2.49	3
South	1.00	2.00	3
West	1.35	2.51	3
East Technical	1.00	1.82	2.95
West Technical	1.00	1.88	2.93
West Commerce	1.17	2.31	3
East Commerce	1.00	2.00	3
Collinwood	1.00	2.00	3
Total	1.10	2.19	3